SEW EURODRIVE

MOVIDRIVE® MDX60B/61B

Edition

02/2004

Operating Instructions

1122 2913 / EN

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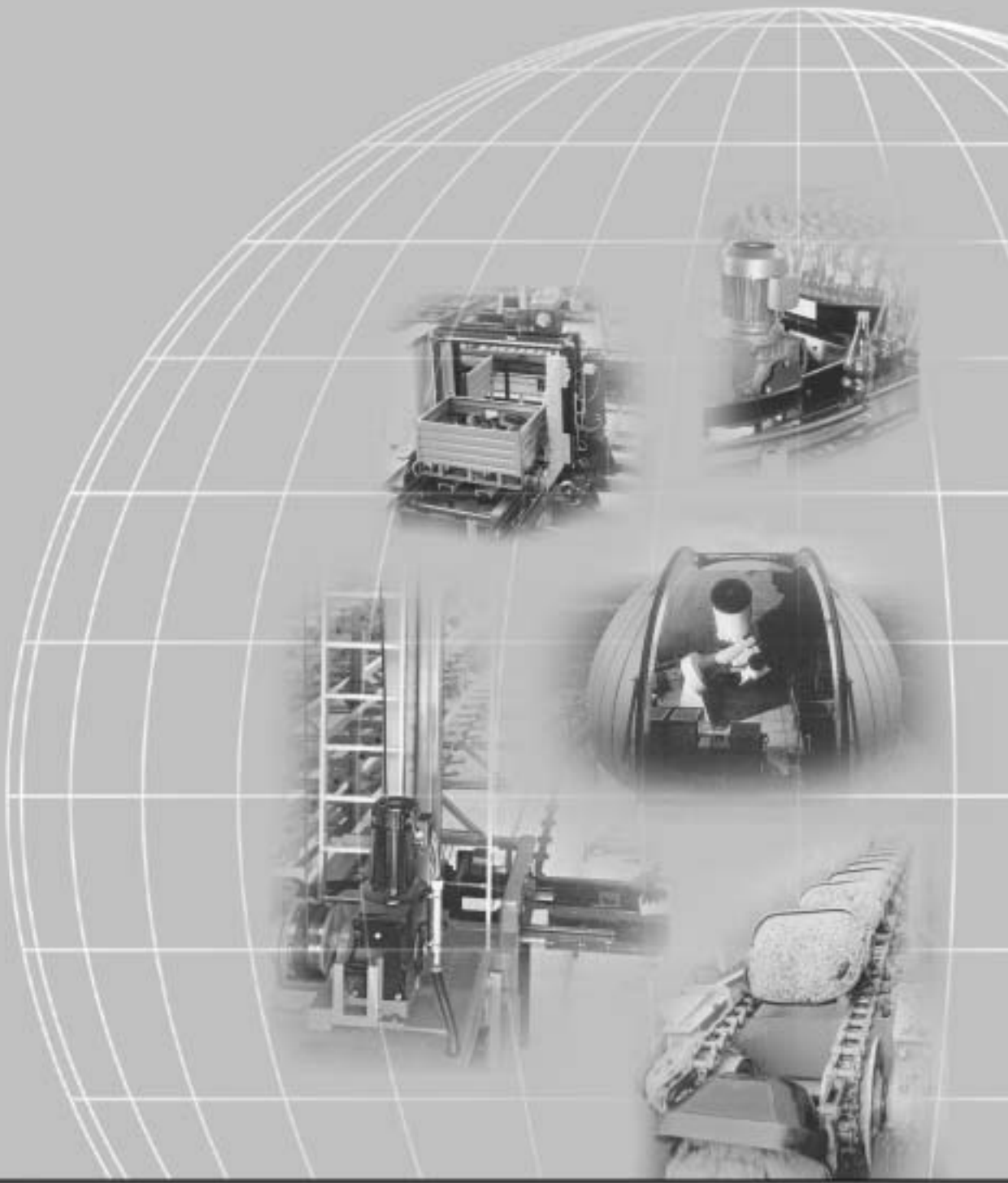

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1 Important Notes

Safety and warning notes

Always observe the safety and warning notes in this publication!

Electrical hazard
Possible consequences: Severe or fatal injuries.

Hazard
Possible consequences: Severe or fatal injuries.

Hazardous situation
Possible consequences: Slight or minor injuries.

Harmful situation
Possible consequences: Damage to the unit and the environment.

Tips and useful information.

A requirement of fault-free operation and fulfillment of any rights to claim under guarantee is that you adhere to the information in the **operating instructions**. Consequently, **read the operating instructions** before you start operating the unit!

The **operating instructions** contain **important information about service**; as a result, they should be kept **close to the unit**.

Designated use

MOVIDRIVE® MDX60/61B drive inverters are units for industrial and commercial use of AC asynchronous motors with squirrel-cage rotors or permanent-field AC synchronous motors. These motors must be suitable for operation with frequency inverters. No other loads may be connected to the units.

MOVIDRIVE® MDX60/61B drive inverters are units intended for stationary installation in control cabinets. All instructions on the technical data and the permitted conditions where the unit is operated must be observed.

Do not operate the unit until you have established that the machine complies with the EMC Directive 89/336/EEC and that the conformity of the end product has been determined in accordance with the Machinery Directive 89/392/EEC (with reference to EN 60204).

Operational environment

The following uses are forbidden unless measures are expressly taken to make them possible:

- Use in explosion-proof areas
- Use in areas exposed to harmful oils, acids, gases, vapors, dust, radiation, etc.
- Use in non-stationary applications which are subject to mechanical vibration and shock loads in excess of the requirements in EN 50178.

Safety functions

MOVIDRIVE® MDX60/61B drive inverters may not perform safety functions without higher-level safety systems.

Use higher level safety systems to guarantee the protection of machinery and persons.

For safety applications, refer to the following publications:

- **Safe disconnection for MOVIDRIVE® MDX60B / 61B – Conditions**
- **Safe disconnection for MOVIDRIVE® MDX60B / 61B – Applications**

Disposal

Dispose in accordance with the regulations in force for the following materials:

- Electronics scrap (circuit boards)
- Plastic (housing)
- Sheet metal
- Copper

etc.

2 Safety Notes

Installation and startup

- **Never install damaged products or take them into operation.** Please submit a complaint to the shipping company immediately in the event of damage.
- **Installation, startup and service work** may only be performed by **trained personnel** observing applicable accident prevention regulations and operating instructions! The regulations in force (e.g. EN 60204, VBG 4, DIN-VDE 0100/0113/0160) must also be complied with.
- Follow the **specific instructions** during **installation** and **startup** of the motor and the brake!

- Make sure that **preventive measures** and **protection devices** correspond to the **applicable regulations** (e.g. EN 60204 or EN 50178).

  Required preventive measures: Grounding the unit

  Required protection device: Overcurrent protection devices
- **The unit meets all requirements for reliable isolation** of power and electronics connections in accordance with EN 50178. **All connected circuits** must also **satisfy the requirements for reliable isolation**.
- Take **suitable measures** (e.g. disconnecting the electronics terminal block) to ensure that the connected **motor does not start up automatically** when the inverter **is switched on**.

Operation and service

- **Disconnect the unit from the supply system** before **removing the protective cover. Dangerous voltages** may still be present for up to **10 minutes after mains disconnection**.

- The unit has **IP 00** enclosure with the **protective cover removed**. **Dangerous voltages** are present at all subassemblies except for the control electronics. The unit must be closed during operation.
- **When the unit switch is in the ON position, DANGEROUS VOLTAGES** are present at the **output terminals** as well as any **connected cables and motor terminals**. This also applies even when the unit is inhibited and the motor at a standstill.
- The fact that the **operation LED and other display elements** have gone out **does not mean** that the unit has been disconnected from the supply system and is **de-energized**.

- **Safety functions inside the unit** or a **mechanical blockage** may cause the **motor to stop**. The **removal of the source of the malfunction** or a **reset** can result in an **automatic restart of the drive**. If, for safety reasons, this is **not permissible** for the driven machine, the **unit must be disconnected from the supply system** before correcting the fault. In such cases, the **"Auto reset" function (P841) may not be activated.**
- The inverter output may only be **switched when the output stage is inhibited**.

3 Unit Design

3.1 Unit Designation, Nameplates and Scope of Delivery

Example: Unit designation

MDX60 B 0011 - 5 A 3 - 4 00

Version	00 = Standard 0T = Application XX = Special unit
Quadrants	4 = 4Q (with brake chopper)
Connection type	3 = 3-phase
Interference suppression on the supply side	B = Radio interference suppression B A = Radio interference suppression A 0 = No radio interference suppression
Supply voltage	5 = 380 ... AC 500 V 2 = 200 ... AC 230 V
Recommended motor power	0011 = 1.1 kW
Version B	
Series	60 = no options can be installed 61 = options can be installed

Example: System nameplate MDX60B/61B.. Size 0

The **system nameplate** for MDX60B/61B.. size 0 is attached to the side of the unit.

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Figure 1: Example system nameplate MDX60B/61B.. size 0

Example: Nameplate of braking resistor for MDX60B/61B..

The braking resistor BW090-P52B is only available for MDX60B/61B size 0.

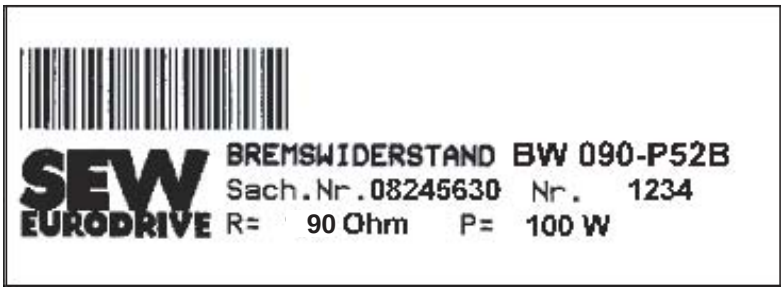

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Figure 2: Nameplate of braking resistor for MDX60B/61B.. size 0

Example: Nameplate of power section MDX61B.. sizes 1 - 6

For MDX61B.. sizes 1-6, the **nameplate of the power section** is located at the side of the unit.

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Figure 3: Nameplate of power section MDX61B.. sizes 1 - 6

Example: Nameplate of control unit MDX61B.. sizes 1 - 6

For MDX61B.. sizes 1-6, the **nameplate of the control unit** is located at the side of the unit.

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Figure 4: Nameplate of control unit MDX61B.. sizes 1 - 6

Scope of delivery

- Connector housing for all signal terminals (X10 ... X17), connected
- Connector housing for the power terminals (X1 ... X4), connected

Size 0

- 1 set of shield clamps for power terminals and electronics terminals, not installed. The set of shield clamps comprises
  - 2 shield clamps for power terminals (2 contact clips each)
  - 1 shield clamp for electronics terminals (1 contact clip) for MDX60B
  - 1 shield clamp for electronics terminals (2 contact clips) for MDX61B
  - 6 contact clips
  - 6 screws for attaching the contact clips
  - 3 screws for attaching the contact clips to the unit

Sizes 1-6

- 1 set of shield clamps for power terminals and electronics terminals, not installed. The set of shield clamps comprises
  - 1 shield clamp for electronics terminals (1 contact clip)
  - 2 contact clips
  - 2 screws for attaching the contact clips
  - 1 screw for attaching the shield clamps to the unit

3.2 Unit design, size 0

MDX60/61B-5A3 (400/500 V units): 0005 ... 0014

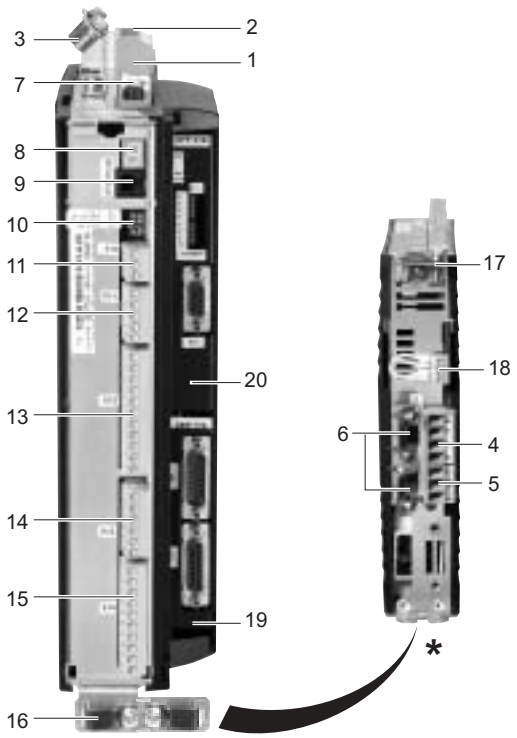

Figure 5: Unit design, MOVIDRIVE® MDX60/61B, size 0

* View of unit underside

[1] X1: Mains connection L1 (1) / L2 (2) / L3 (3) and PE connection, separable
[2] X4: DC link connection $-U_Z$ / $+U_Z$ and PE connection, separable
[3] Power shield clamp for mains connection and DC link connection
[4] X2: Motor connection U (4) / V (5) / W (6) and PE connection, separable
[5] X3: Braking resistor connection R+ (8) / R- (9) and PE connection, separable
[6] Power shield clamp for motor connection and braking resistor connection
[7] Memory card
[8] 7-segment display
[9] Xterminal: Slot for DBG60B keypad or UWS21A serial interface
[10] DIP switches S11 ... S14
[11] X12: Electronics terminal strip system bus (SBus)
[12] X11: Electronics terminal strip setpoint input AI1 and 10 V reference voltage
[13] X13: Electronics terminal strip binary inputs and RS-485 interface
[14] X16: Electronics terminal strip binary inputs and outputs
[15] X10: Electronics terminal strip binary outputs and TF/TH input
[16] Electronics shield clamp MDX61B size 0
[17] Electronics shield clamp MDX60B size 0
[18] X17: Electronics terminal strip safety contacts for safe stop
[19] Only with MDX61B: Encoder slot for encoder connection
[20] Only with MDX61B: Fieldbus slot for fieldbus interface

3.3 Unit design, size 1

MDX61B-5A3 (400/500 V units): 0015 ... 0040

MDX61B-2A3 (230 V units): 0015 ... 0037

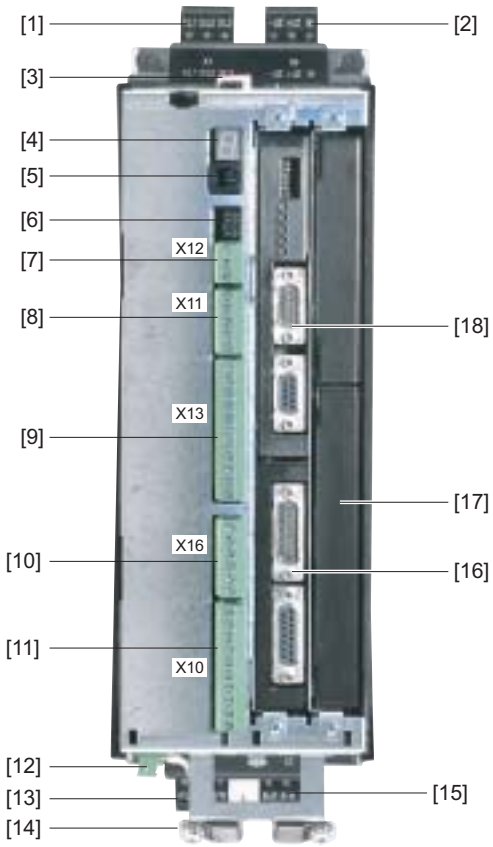

Figure 6: Unit design MOVIDRIVE® MDX61B, size 1

[1] X1: Mains connection L1 (1) / L2 (2) / L3 (3), separable
[2] X4: DC link connection $-U_Z$ / $+U_Z$, separable
[3] Memory card
[4] 7-segment display
[5] Xterminal: Slot for DBG60B keypad or UWS21A serial interface
[6] DIP switches S11 ... S14
[7] X12: Electronics terminal strip system bus (SBus)
[8] X11: Electronics terminal strip setpoint input AI1 and 10 V reference voltage
[9] X13: Electronics terminal strip binary inputs and RS-485 interface
[10] X16: Electronics terminal strip binary inputs and outputs
[11] X10: Electronics terminal strip binary outputs and TF/TH input
[12] X17: Electronics terminal strip safety contacts for safe stop
[13] X2: Motor connection U (4) / V (5) / W (6) and PE connection, separable
[14] Electronics shield clamp and PE connection
[15] X3: Braking resistor connection R+ (8) / R- (9) and PE connection, separable
[16] Encoder slot for encoder connection
[17] Expansion slot
[18] Fieldbus slot for fieldbus interface

3.4 Unit design, size 2S

MDX61B-5A3 (400/500 V units): 0055 / 0075

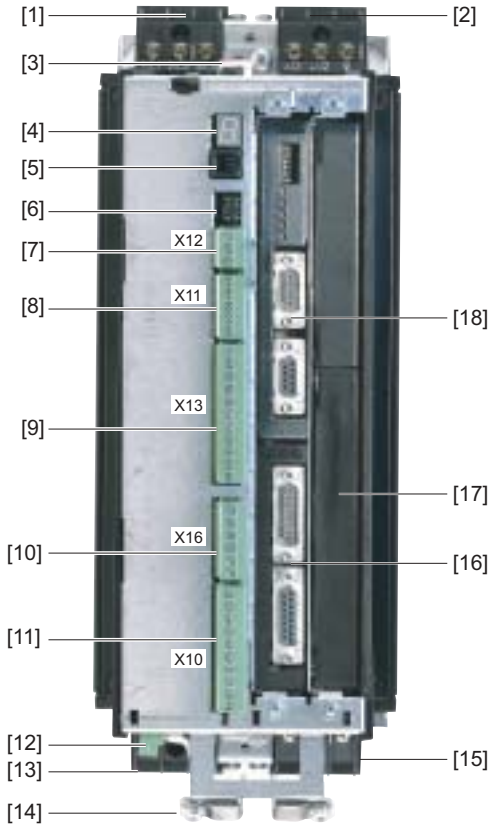

Figure 7: Unit design MOVIDRIVE® MDX61B, size 2S

[1] X1: Power system connection L1 (1) / L2 (2) / L3 (3)
[2] X4: DC link connection $-U_Z$ / $+U_Z$ and PE connection
[3] Memory card
[4] 7-segment display
[5] Xterminal: Slot for DBG60B keypad or UWS21A serial interface
[6] DIP switches S11 ... S14
[7] X12: Electronics terminal strip system bus (SBus)
[8] X11: Electronics terminal strip setpoint input AI1 and 10 V reference voltage
[9] X13: Electronics terminal strip binary inputs and RS-485 interface
[10] X16: Electronics terminal strip binary inputs and outputs
[11] X10: Electronics terminal strip binary outputs and TF/TH input
[12] X17: Electronics terminal strip safety contacts for safe stop
[13] X2: Motor connection U (4) / V (5) / W (6)
[14] Electronics shield clamp and PE connection
[15] X3: Braking resistor connection R+ (8) / R- (9) and PE connection
[16] Encoder slot for encoder connection
[17] Expansion slot
[18] Fieldbus slot for fieldbus interface

3.5 Unit design, size 2

MDX61B-5A3 (400/500 V units): 0110

MDX61B-2A3 (230 V units): 0055 / 0075

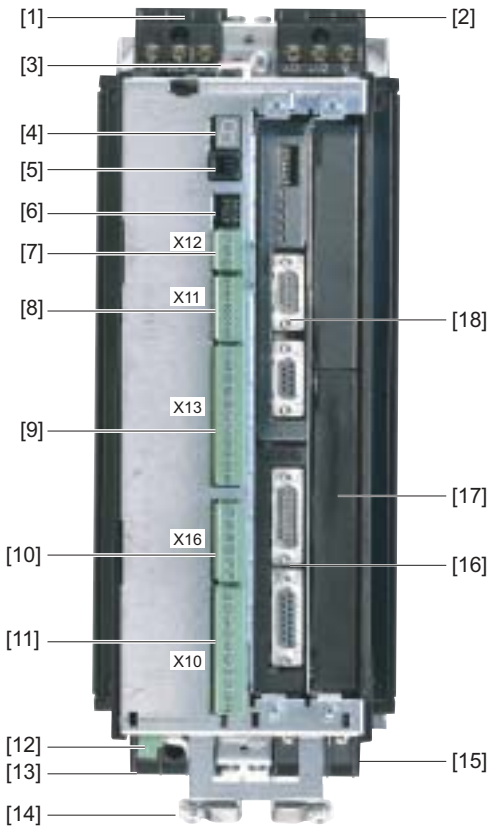

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Figure 8: Unit design MOVIDRIVE® MDX61B, size 2

[1] X1: Power supply connection L1 (1) / L2 (2) / L3 (3)

[2] X4: DC link connection $-U_Z$ / $+U_Z$ and PE connection

[3] Memory card

[4] 7-segment display

[5] Xterminal: Slot for DBG60B keypad or UWS21A serial interface

[6] DIP switches S11 ... S14

[7] X12: Electronics terminal strip system bus (SBus)

[8] X11: Electronics terminal strip setpoint input AI1 and 10 V reference voltage

[9] X13: Electronics terminal strip binary inputs and RS-485 interface

[10] X16: Electronics terminal strip binary inputs and outputs

[11] X10: Electronics terminal strip binary outputs and TF/TH input

[12] X17: Electronics terminal strip safety contacts for safe stop

[13] X2: Motor connection U (4) / V (5) / W (6)

[14] Electronics shield clamp and PE connection

[15] X3: Braking resistor connection R+ (8) / R- (9) and PE connection

[16] Encoder slot for encoder connection

[17] Expansion slot

[18] Fieldbus slot for fieldbus interface

3.6 Unit design, size 3

MDX61B-503 (400/500 V units): 0150 ... 0300

MDX61B-203 (230 V units): 0110 / 0150

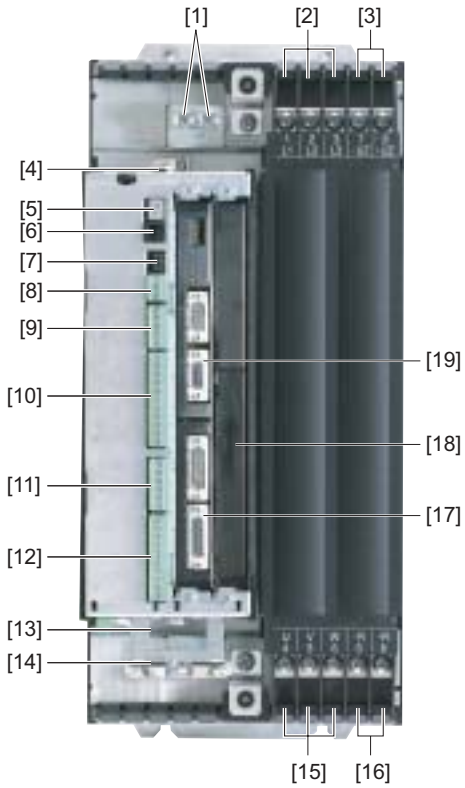

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Figure 9: Unit design MOVIDRIVE® MDX61B, size 3

[1] PE connections
[2] X1: Power supply connection L1 (1) / L2 (2) / L3 (3)
[3] X4: DC link connection $-U_Z$ / $+U_Z$
[4] Memory card
[5] 7-segment display
[6] Xterminal: Slot for DBG60B keypad or UWS21A serial interface
[7] DIP switches S11 ... S14
[8] X12: Electronics terminal strip system bus (SBus)
[9] X11: Electronics terminal strip setpoint input AI1 and 10 V reference voltage
[10] X13: Electronics terminal strip binary inputs and RS-485 interface
[11] X16: Electronics terminal strip binary inputs and outputs
[12] X10: Electronics terminal strip binary outputs and TF/TH input
[13] X17: Electronics terminal strip safety contacts for safe stop
[14] Electronics shield clamp and PE connection
[15] X2: Motor connection U (4) / V (5) / W (6)
[16] X3: Braking resistor connection R+ (8) / R- (9)
[17] Encoder slot for encoder connection
[18] Expansion slot
[19] Fieldbus slot for fieldbus interface

3.7 Unit design, size 4

MDX61B-503 (400/500 V units): 0370 / 0450

MDX61B-203 (230 V units): 0220 / 0300

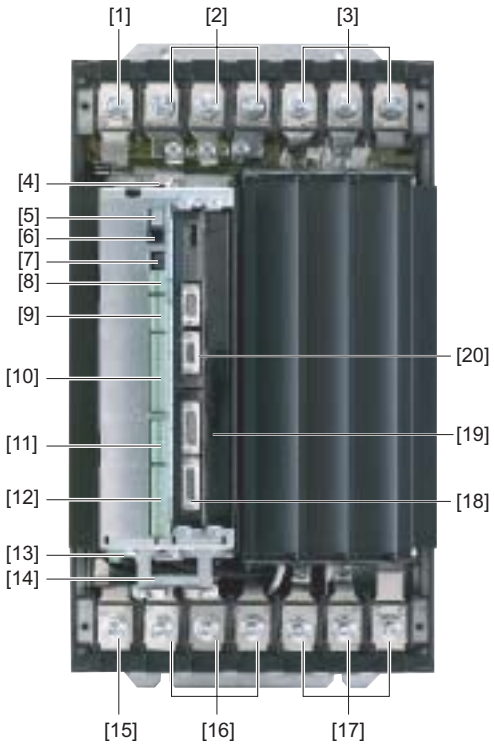

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Figure 10: Unit design MOVIDRIVE® MDX61B, size 4

[1] PE connection
[2] X1: Power supply connection L1 (1) / L2 (2) / L3 (3)
[3] X4: DC link connection $-U_Z$ / $+U_Z$ and PE connection
[4] Memory card
[5] 7-segment display
[6] Xterminal: Slot for DBG60B keypad or UWS21A serial interface
[7] DIP switches S11 ... S14
[8] X12: Electronics terminal strip system bus (SBus)
[9] X11: Electronics terminal strip setpoint input AI1 and 10 V reference voltage
[10] X13: Electronics terminal strip binary inputs and RS-485 interface
[11] X16: Electronics terminal strip binary inputs and outputs
[12] X10: Electronics terminal strip binary outputs and TF/TH input
[13] X17: Electronics terminal strip safety contacts for safe stop
[14] Electronics shield clamp
[15] PE connection
[16] X2: Motor connection U (4) / V (5) / W (6)
[17] X3: Braking resistor connection R+ (8) / R- (9) and PE connection
[18] Encoder slot for encoder connection
[19] Expansion slot
[20] Fieldbus slot for fieldbus interface

3.8 Unit design, size 5

MDX61B-503 (400/500 V units): 0550 / 0750

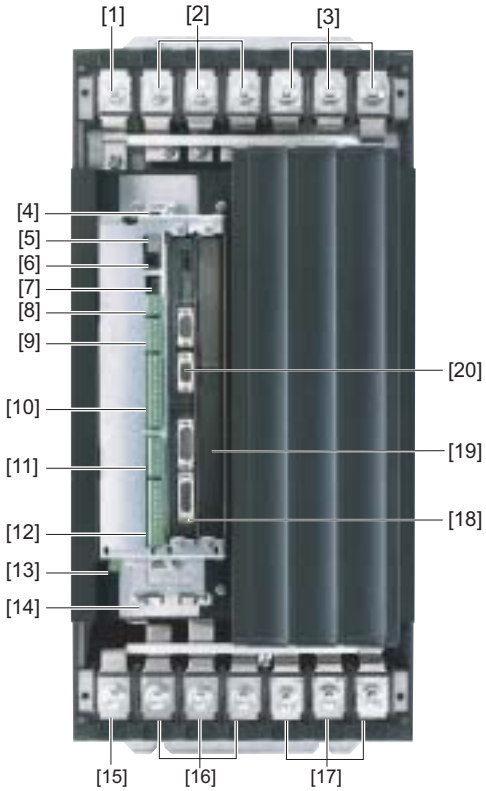

Figure 11: Unit design MOVIDRIVE® MDX61B, size 5

[1] PE connection
[2] X1: Power supply connection L1 (1) / L2 (2) / L3 (3)
[3] X4: DC link connection $-U_Z$ / $+U_Z$ and PE connection
[4] Memory card
[5] 7-segment display
[6] Xterminal: Slot for DBG60B keypad or UWS21A serial interface
[7] DIP switches S11 ... S14
[8] X12: Electronics terminal strip system bus (SBus)
[9] X11: Electronics terminal strip setpoint input AI1 and 10 V reference voltage
[10] X13: Electronics terminal strip binary inputs and RS-485 interface
[11] X16: Electronics terminal strip binary inputs and outputs
[12] X10: Electronics terminal strip binary outputs and TF/TH input
[13] X17: Electronics terminal strip safety contacts for safe stop
[14] Electronics shield clamp
[15] PE connection
[16] X2: Motor connection U (4) / V (5) / W (6)
[17] X3: Braking resistor connection R+ (8) / R- (9) and PE connection
[18] Encoder slot for encoder connection
[19] Expansion slot
[20] Fieldbus slot for fieldbus interface

3.9 Unit design, size 6

MDX61B-503 (400/500 V units): 0900 ... 1320

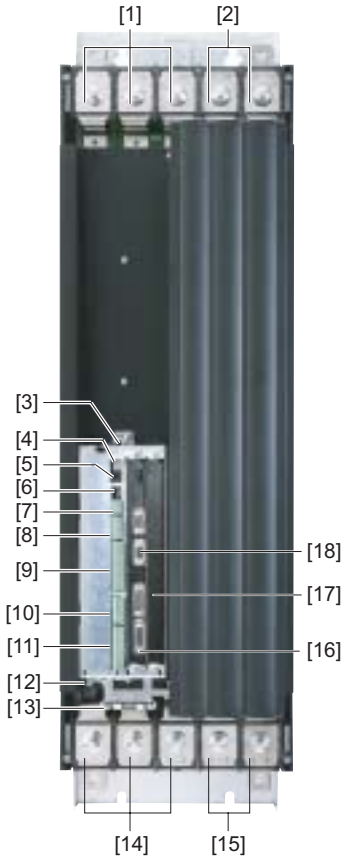

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Figure 12: Unit design MOVIDRIVE® MDX61B, size 6

[1] X1: Power supply connection L1 (1) / L2 (2) / L3 (3) and PE connection
[2] X4: DC link connection $-U_Z$ / $+U_Z$ and PE connection
[3] Memory card
[4] 7-segment display
[5] Xterminal: Slot for DBG60B keypad or UWS21A serial interface
[6] DIP switches S11 ... S14
[7] X12: Electronics terminal strip system bus (SBus)
[8] X11: Electronics terminal strip setpoint input AI1 and 10 V reference voltage
[9] X13: Electronics terminal strip binary inputs and RS-485 interface
[10] X16: Electronics terminal strip binary inputs and outputs
[11] X10: Electronics terminal strip binary outputs and TF/TH input
[12] X17: Electronics terminal strip safety contacts for safe stop
[13] Electronics shield clamp
[14] X2: Motor connection U (4) / V (5) / W (6) and PE connection
[15] X3: Braking resistor connection R+ (8) / R- (9) and PE connection
[16] Encoder slot for encoder connection
[17] Expansion slot
[18] Fieldbus slot for fieldbus interface

4 Installation

4.1 Installation instructions for basic unit

It is essential to comply with the safety notes during installation!

Installation notes for size 6

MOVIDRIVE® size 6 units (0900 ... 1320) are equipped with a factory mounted lifting lug [1]. If possible, use crane and lifting lug [1] for installing the unit.

If a crane cannot be used, you can push a carrying rod [2] (included in the delivery of size 6) through the rear panel to facilitate installation. Secure the carrying rod [2] against axial displacement using the split pin [3].

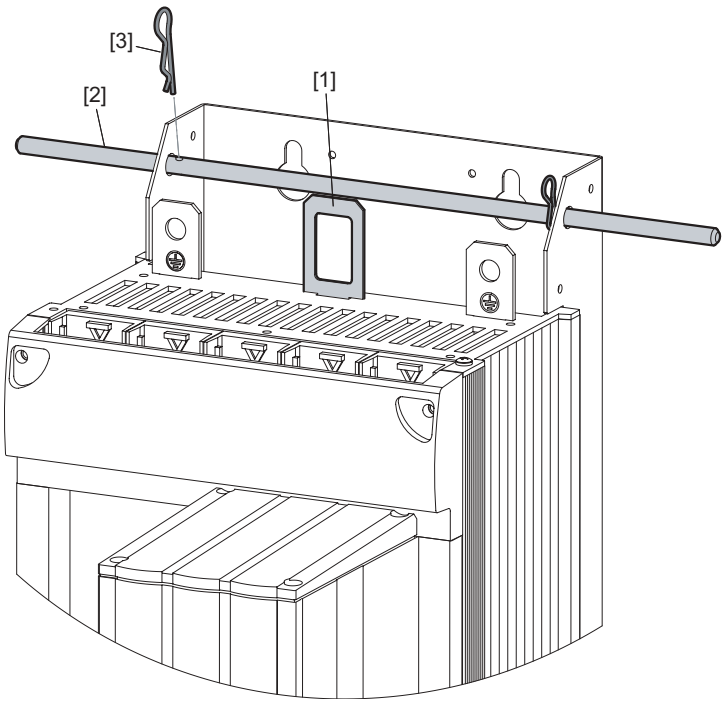

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Figure 13: Installing MOVIDRIVE® size 6 with factory mounted lifting lug and carrying rod

[1] Factory mounted lifting lug

[2] Carrying rod (included in the delivery of size 6)

[3] Split pin (included in the delivery of size 6)

Tightening torques

- Only use **genuine connection elements**. Note the **permitted tightening torques** of MOVIDRIVE® power terminals.
  - Sizes 0 and 1 → 0.6 Nm (5.3 lb.in)
  - Sizes 2S and 2 → 1.5 Nm (13.3 lb.in)
  - Size 2 → 1.5 Nm (13.3 lb.in)
  - Size 3 → 3.5 Nm (31 lb.in)
  - Sizes 4 and 5 → 14 Nm (124 lb.in)
  - Size 6 → 20 Nm (177 lb.in)
- The **permitted tightening torque** of the **signal terminals** is 0.6 Nm (5.3 lb.in).

Min. clearance and mounting position

- Leave **100 mm (4 in) clearance at the top and bottom** for optimum cooling. Make sure air circulation in the clearance is not impaired by cables or other installation material. With sizes 4, 5 and 6, do not install any components which are sensitive to high temperatures within 300 mm (11.81 in) of the top of the unit.
- Ensure an unobstructed cooling air supply and that air heated by other units cannot be drawn in or reused.
- No lateral clearance required; the units can be lined up side-by-side.
- Install the units **vertically** only. Do not install them horizontally, tilted or upside down (→ following figure, applies to all sizes).

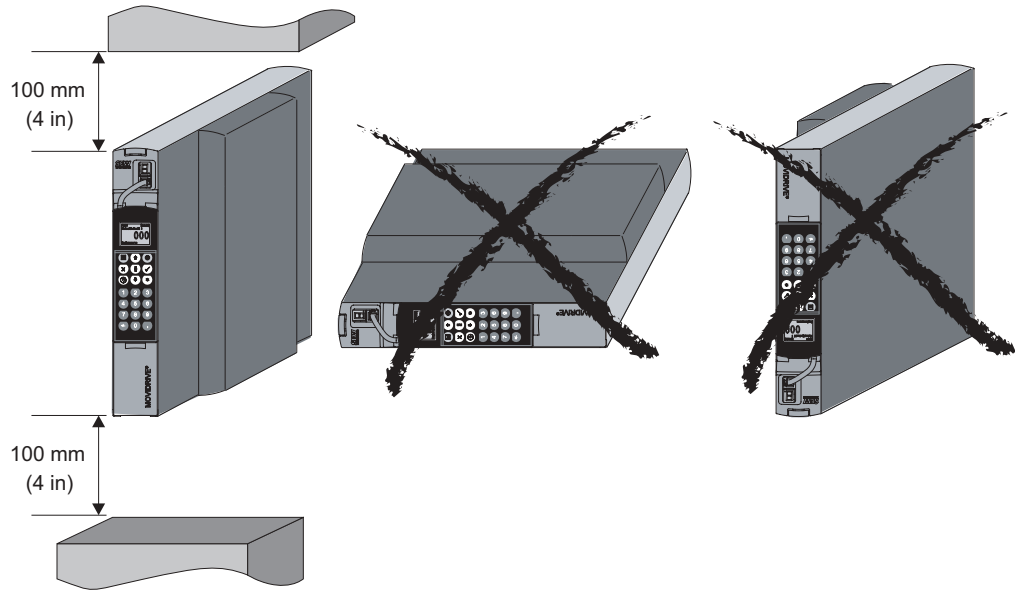

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Figure 14: Minimum clearance and mounting position of the units

Separate cable ducts

- Route **power cables** and **electronics cables** in **separate cable ducts**.

Input fuses and earth-leakage circuit breakers

- Install the **input fuses at the beginning of the supply system lead** after the supply bus junction (→ Wiring diagram for basic unit, power section and brake).
- **Earth leakage circuit breaker as sole protection device:** Only use earth leakage circuit breakers type B according to EN 50178.

Supply system and brake contactors

- **Only use contactors in utilization category AC-3** (IEC 158-1) as supply system and brake contactors.

PE input connection (→ EN 50178)

- With a **power supply line < 10 mm² (AWG 8)**: Route a **second PE conductor with the cross section of the power supply line** in parallel to the protective earth via separate terminals or use a **copper protective earth with a cross section of 10 mm² (AWG 8)**.
- With a **power supply line ≥ 10 mm² (AWG 8)**: Route a **copper protective earth conductor with the cross section of the power supply line**.

IT systems

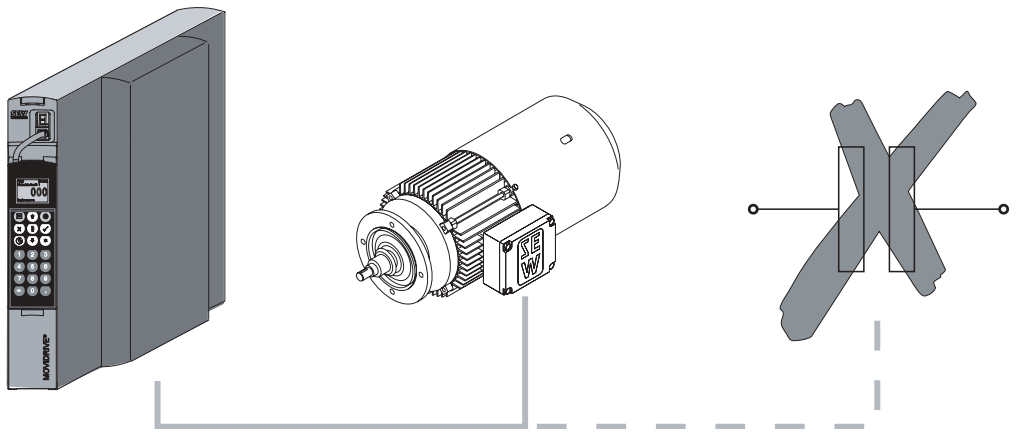
- SEW recommends using **earth-leakage monitors with pulse-code measurement** for power supply systems with non-grounded star point **(IT systems)**. The use of such devices avoids mis-tripping of the earth-leakage monitor due to the earth capacitance of the inverter.

Cross sections

- Power supply line: **Cross section according to rated input current** I_{mains} at rated load.
- Motor cable: **Cross section according to rated output current** I_{rated}.
- Electronics cables of basic unit (terminals X10, X11, X12, X13, X16):
  - One core per terminal 0.20 ... 2.5 mm^2 (AWG 24 ... 12)
  - Two cores per terminal 0.25 ... 1 mm^2 (AWG 22 ... 17)
- Electronics cables terminal X17, and DIO11B terminal expansion board (terminals X20, X21, X22):
  - One core per terminal 0.08 ... 1.5 mm^2 (AWG 28 ... 16)
  - Two cores per terminal 0.25 ... 1 mm^2 (AWG 22 ... 17)

Unit output

- **Only connect ohmic/inductive loads (motors).** Never connect capacitive loads!



51412AXX

Figure 15: Only connect ohmic/inductive loads; do not connect capacitive loads

Connecting braking resistors

- Use **two closely twisted cables or a 2-core shielded power cable**. Cross section according to the rated output current of the inverter.
- Protect the braking resistor (except for BW90-P52B) using a **bimetallic relay** (→ wiring diagram for basic unit, power section and brake). Set the **trip current** according to the **technical data of the braking resistor**.

Operating braking resistors

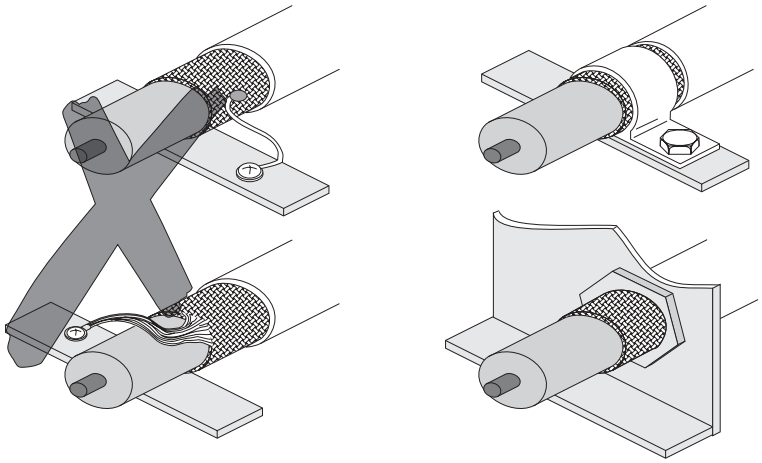
- The connection leads to the braking resistors carry a **high DC voltage (ca. 900 V)** during rated operation.
- The **surfaces** of the braking resistors get **very hot** when the braking resistors are loaded with P_{rated}. Select a **suitable installation position**. Braking resistors are usually mounted on the control cabinet roof.
- Install the **flat-type braking resistors** together with the appropriate **touch guard**.

Binary inputs / binary outputs

- The **binary inputs** are **electrically isolated** by optocouplers.
- The **binary outputs** are **short-circuit proof**, although they are **not interference-voltage-proof** (exception: relay output DOØ1). External voltage can cause irreparable damage to the binary outputs.

EMC-compliant installation

- All cables except for the power supply line must be **shielded**. As an alternative to the shield, the HD.. option (output choke) can be used for the motor cable to reach interference emission limits.
- Connect the **shield by the shortest possible route and make sure it is earthed over a wide area at both ends**. You can ground one end of the shield via a suppression capacitor (220 nF / 50 V) to avoid ground loops. If using double-shielded cables, ground the outer shield on the inverter end and the inner shield on the other end.



00755BXX

Figure 16: Correct shield connection using metal clamp (shield clamp) or metal cable gland

- You can also use **earthed sheet-metal ducts or metal pipes** to **shield the cables**. **Route** the **power and control cables separately**.
- Provide **high frequency compatible grounding** for the **inverter** and **all additional units** (wide area metal-on-metal contact between the unit housing and ground, e.g. unpainted control cabinet mounting panel).
- This is a product with restricted availability in accordance with IEC 61800-3. This product may cause radio frequency interference in residential environments. In such cases, the operator may need to implement appropriate measures.
- For detailed information on EMC-compliant installation, refer to the publication "Electromagnetic Compatibility in Drive Engineering" from SEW-EURODRIVE.

NF.. input filter

- The NF.. line filter option can be used to maintain the class B limit on the supply side.
- Install the **line filter close to the inverter** but outside the minimum clearance for cooling.
- Restrict the **cable between the line filter and the inverter to the absolute minimum length required**, and never more than 400 mm (15.8 in). Unshielded, twisted cables are sufficient. Also use unshielded cables as the power supply line.
- **No EMC limits are specified for interference emission** in **voltage supply systems without earthed star point** (IT systems). The **effectiveness of line filters** in IT systems is **severely limited**.
- SEW-EURODRIVE recommends one of the following **EMC measures on the motor side to maintain class A and B limits**:
  - Shielded motor cable
  - HD... output choke option

HD... output choke

- Install the **output choke close to the inverter** but outside the minimum clearance for cooling.
- Route **all three phases together through the output choke**. **Do not route the PE conductor through the output choke!**

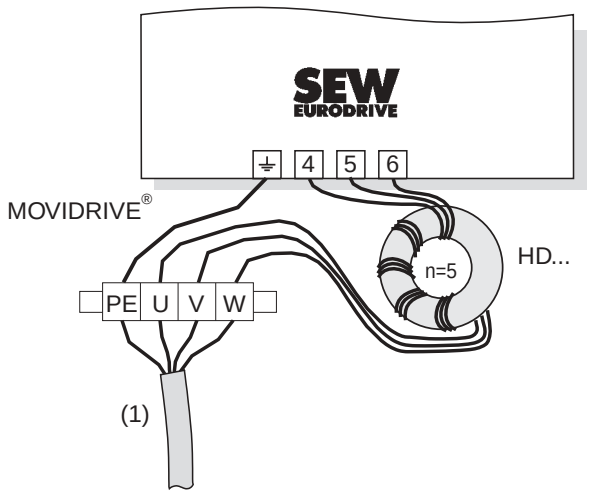


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Figure 17: Connecting HD... output chokes

(1) = Motor cable

4.2 Removing/installing the keypad

Removing the keypad

Proceed in this order:

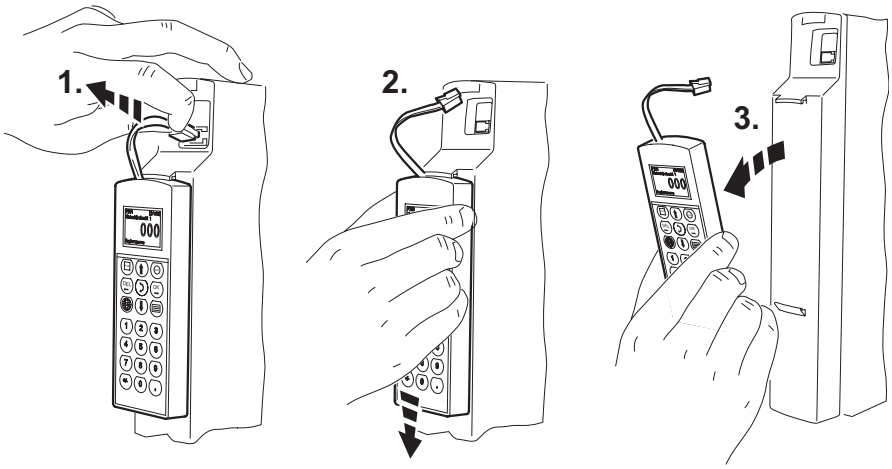

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Figure 18: Removing the keypad

1. Unplug the connection cable from the Xterminal.
2. Carefully push the keypad downward until it comes off the upper fixture on the front cover.
3. Remove the keypad **forward** (not to the side!).

Installing the keypad

Proceed in this order:

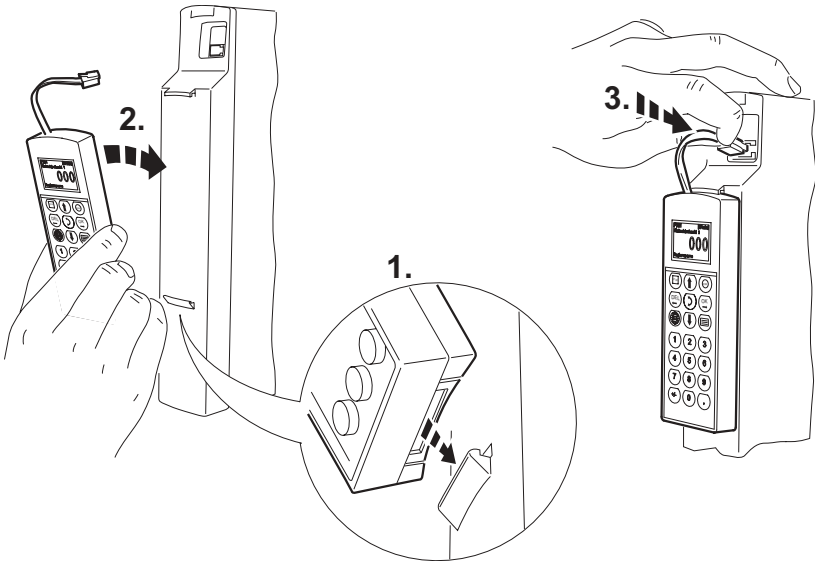

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Figure 19: Installing the keypad

1. Place the keypad with the bottom side onto the lower fixture of the front cover.
2. Push the keypad into the upper fixture of the front cover.
3. Plug the connecting cable into the Xterminal.

4.3 Removing/installing the front cover

Removing the front cover

Proceed as follows to remove the front cover:

- If a keypad is installed, remove it first (→ page 20).

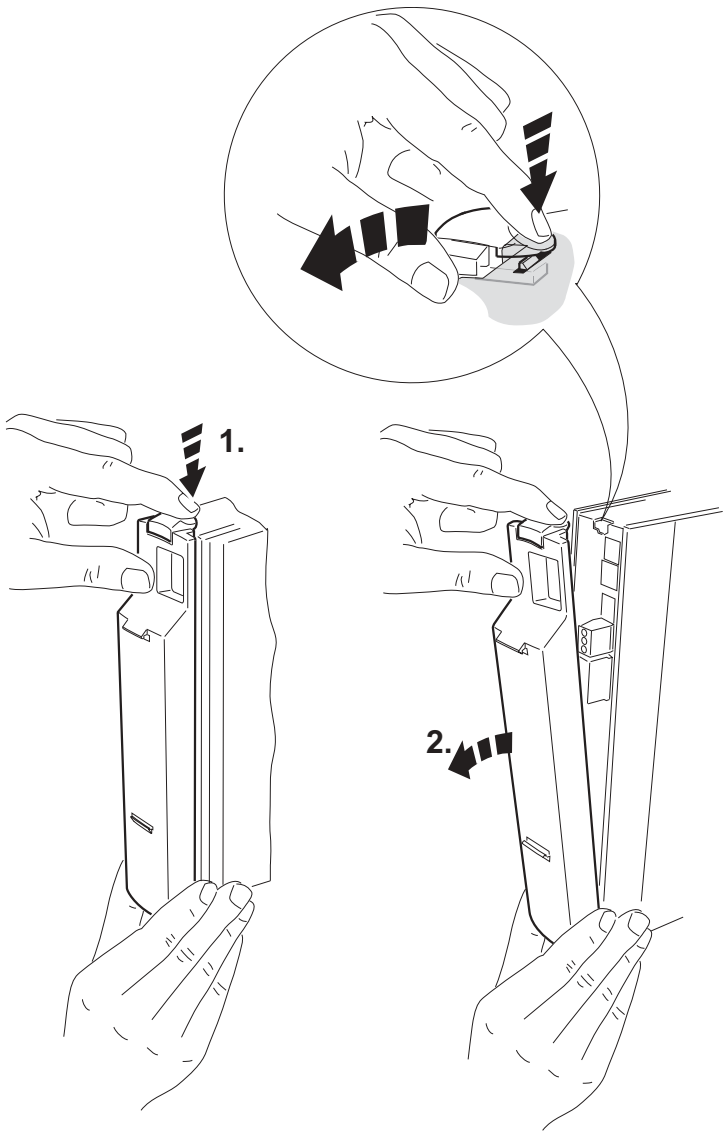

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Figure 20: Removing the front cover

1. Press the grooved clip on top of the front cover.
2. Keep the clip pressed down to remove the front cover.

Installing the front cover

Proceed as follows to install the front cover:

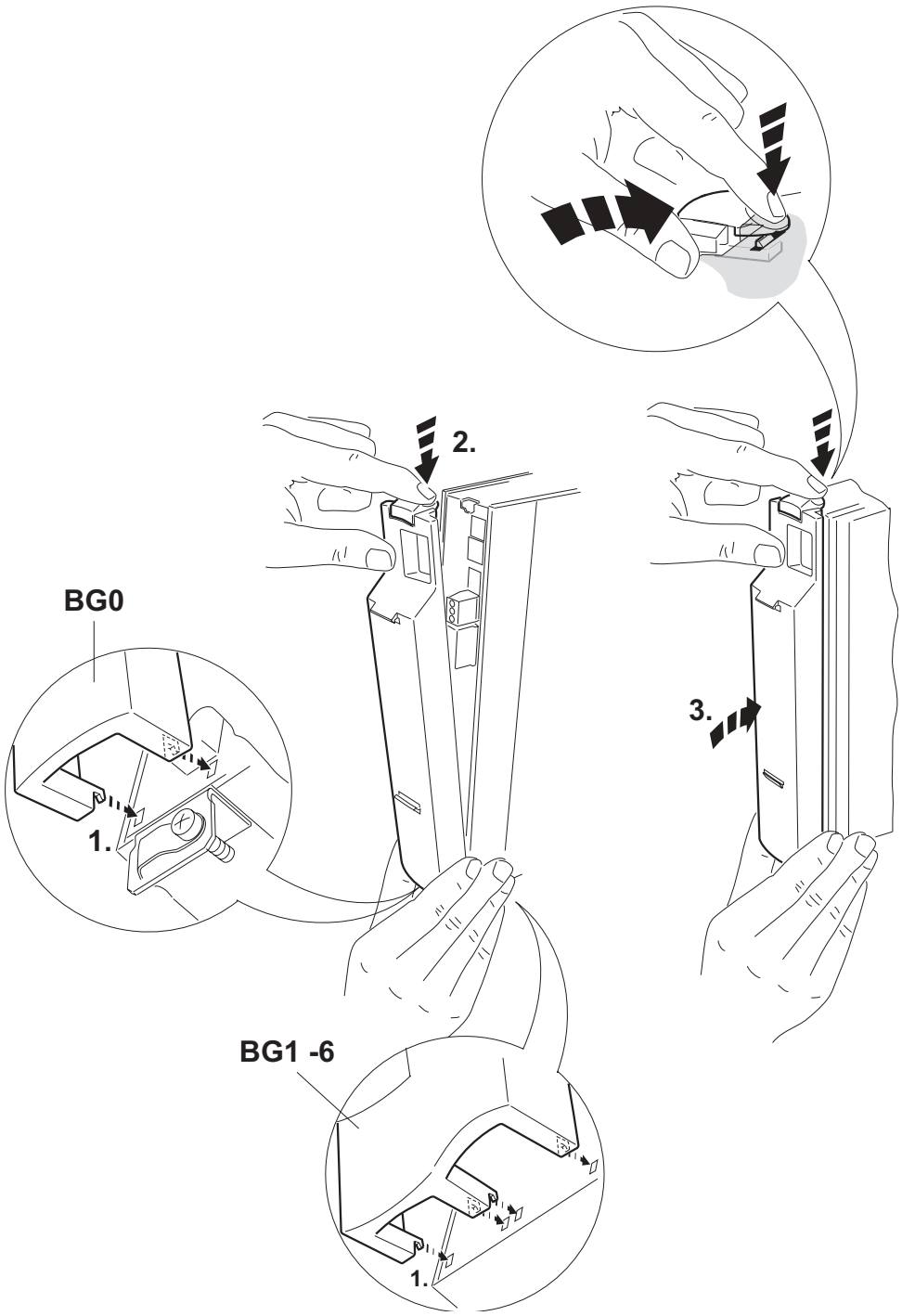

Figure 21: Installing the front cover

1. Insert the front cover with the bottom side into the support.
2. Keep the grooved clip on top of the front cover pressed down.
3. Push the front cover onto the unit.

4.4 UL compliant installation

Note the following points for UL compliant installation:

- Only use copper cables with the **following temperature ranges** as connection cables:
  - for MOVIDRIVE® MDX60B/61B0005 ... 0300 temperature range 60/75 °C
  - for MOVIDRIVE® MDX61B0370 ... 1320 temperature range 75/90 °C
- **Permitted tightening torques** for MOVIDRIVE® power terminals:
  - Sizes 0 and 1 → 0.6 Nm (5.3 lb.in)
  - Sizes 2S, 2 → 1.5 Nm (13.3 lb.in)
  - Size 3 → 3.5 Nm (31 lb.in)
  - Sizes 4 and 5 → 14 Nm (124 lb.in)
  - Size 6 → 20 Nm (177 lb.in)
- MOVIDRIVE® drive inverters are **suitable for operation in voltage power systems with an earthed star point** (TN and TT systems), which can supply a max. current in accordance with the following tables and which have a max. voltage of AC 500 V for MOVIDRIVE® MDX61B...-5_3 (400/500 V units) and AC 240 V for MOVIDRIVE® MDX61A...2_3 (230 V units). The performance data of the fuses must not exceed the values listed in the tables.

400/500 V units

MOVIDRIVE® MDX60B/61B...5_3	Max. supply current	Max. supply voltage	Fuses
0005/0008/0011/0014	AC 5000 A	AC 500 V	15 A / 600 V
0015/0022/0030/0040	AC 10000 A	AC 500 V	30 A / 600 V
0055/0075/0110	AC 10000 A	AC 500 V	30 A / 600 V
0150/0220	AC 5000 A	AC 500 V	175 A / 600 V
0300	AC 5000 A	AC 500 V	225 A / 600 V
0370/0450	AC 10000 A	AC 500 V	350 A / 600 V
0550/0750	AC 10000 A	AC 500 V	500 A / 600 V
0900	AC 10000 A	AC 500 V	250 A / 600 V
1100	AC 10000 A	AC 500 V	300 A / 600 V
1320	AC 10000 A	AC 500 V	400 A / 600 V

230 V units

MOVIDRIVE® MDX61A...2_3	Max. supply current	Max. supply voltage	Fuses
0015/0022/0037	AC 5000 A	AC 240 V	30 A / 250 V
0055/0075	AC 5000 A	AC 240 V	30 A / 250 V
0110	AC 5000 A	AC 240 V	175 A / 250 V
0150	AC 5000 A	AC 240 V	225 A / 250 V
0220/0300	AC 10000 A	AC 240 V	350 A / 250 V

- Only use tested units with a **limited output voltage** (V_{max} = DC 30 V) and **limited output current (I ≤ 8 A) as an external DC 24 V voltage source**.

- **UL certification does not apply to operation in voltage supply systems with a non-earthed star point (IT systems).**

4.5 Shield clamps

For size 0

A set of power shield clamps is supplied as standard with MOVIDRIVE® MDX60B/61B size 0. The shield clamps are not yet installed.

Install the shield clamps as follows:

- Secure the contact clips to the shield plates.
- Secure the power shield clamps to the top and the bottom of the unit.

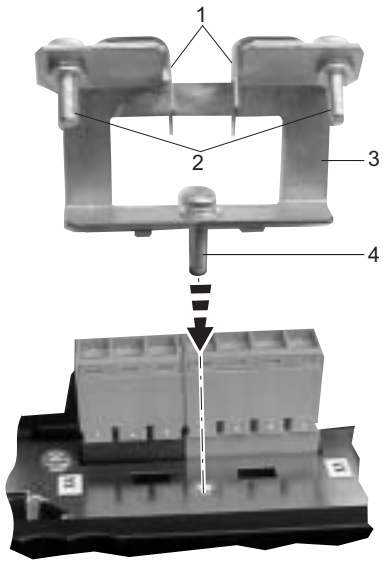

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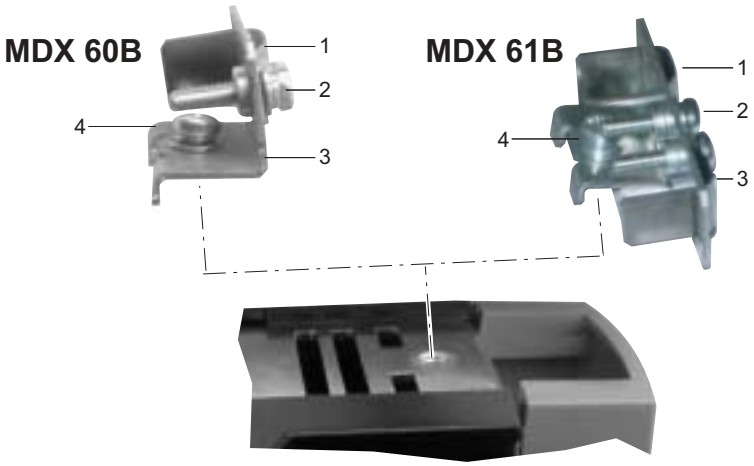
Figure 22: Securing the power shield clamp

[1] Contact clips
[2] Retaining screws for contact clips
[3] Shield plate
[4] Retaining screw for shield clamp

- If installed, remove the keypad and the front cover.
- Secure the electronics shield clamp to the bottom of the unit directly under the electronic terminal strip X14.



51466AXX

Figure 23: Securing the electronics shield clamp

[1] Contact clip
[2] Retaining screw for contact clip
[3] Shield plate
[4] Retaining screw for shield clamp

For size 1

A power shield clamp is supplied as standard with MOVIDRIVE® MDX61B size 1. Install this power shield clamp together with the retaining screws of the unit.

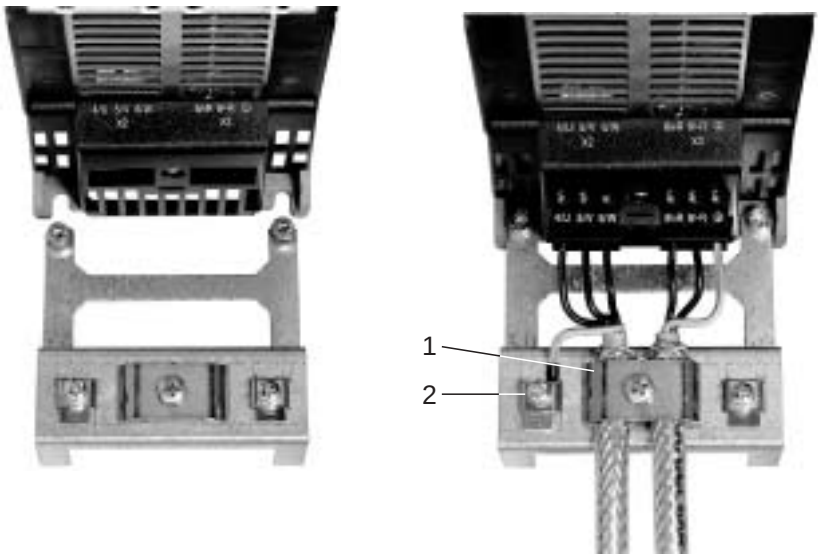


Figure 24: Power shield clamp for MOVIDRIVE® size 1

[1] Shield clamp [2] PE connection (⏚)

For sizes 2S and 2

A power shield clamp with two (2) retaining screws is supplied as standard with MOVIDRIVE® MDX61B sizes 2S and 2. Mount this power shield clamp together with the two retaining screws to X6.

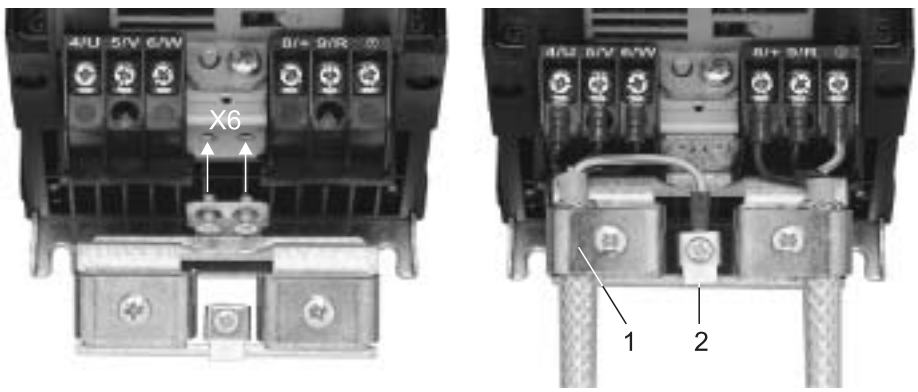


Figure 25: Power shield clamp for MOVIDRIVE® size 2

[1] Shield clamp [2] PE connection (⏚)

Power shield clamps provide you with a very convenient way of installing the shield for the motor and brake cables. Install the shield and PE conductor as shown in the figures.

For sizes 3 to 6

No power shield clamps are supplied with MOVIDRIVE® MDX61B sizes 3 to 6. Use commercially available shield clamps for installing the shielding of motor and brake cables. Apply the shield as closely as possible to the inverter.

4.6 Touch guard

With MOVIDRIVE® size 4 (500 V unit: MDX61B0370/0450; 230 V units: MDX61B0220/0300), size 5 (MDX61B0550/0750) and size 6 (MDX61B0900/1100/1320), two (2) touch guards with eight (8) retaining screws are supplied as standard. Install the touch guard on the two hood covers for the power section terminals.

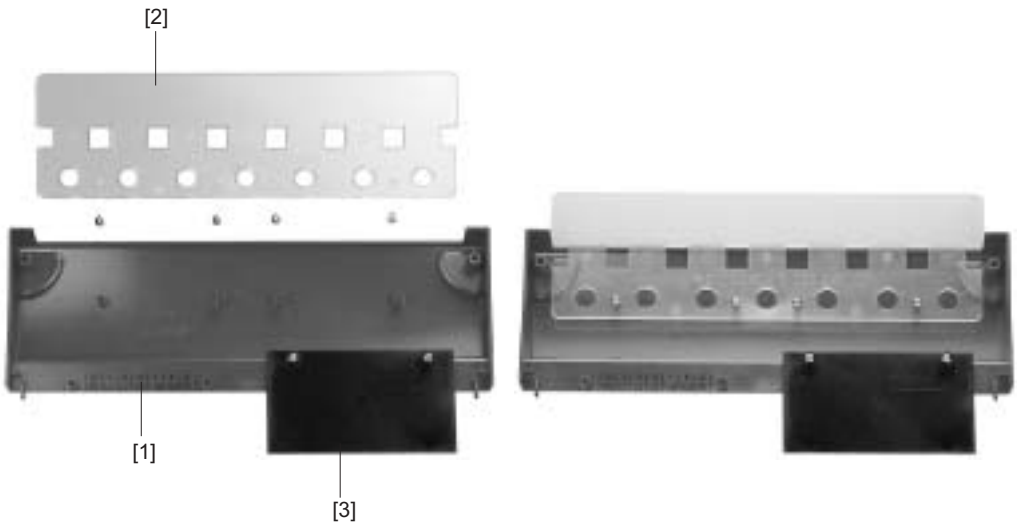


Figure 26: Touch guard for MOVIDRIVE® sizes 4, 5, and 6

The touch guard consist of the following parts:

[1] Cover

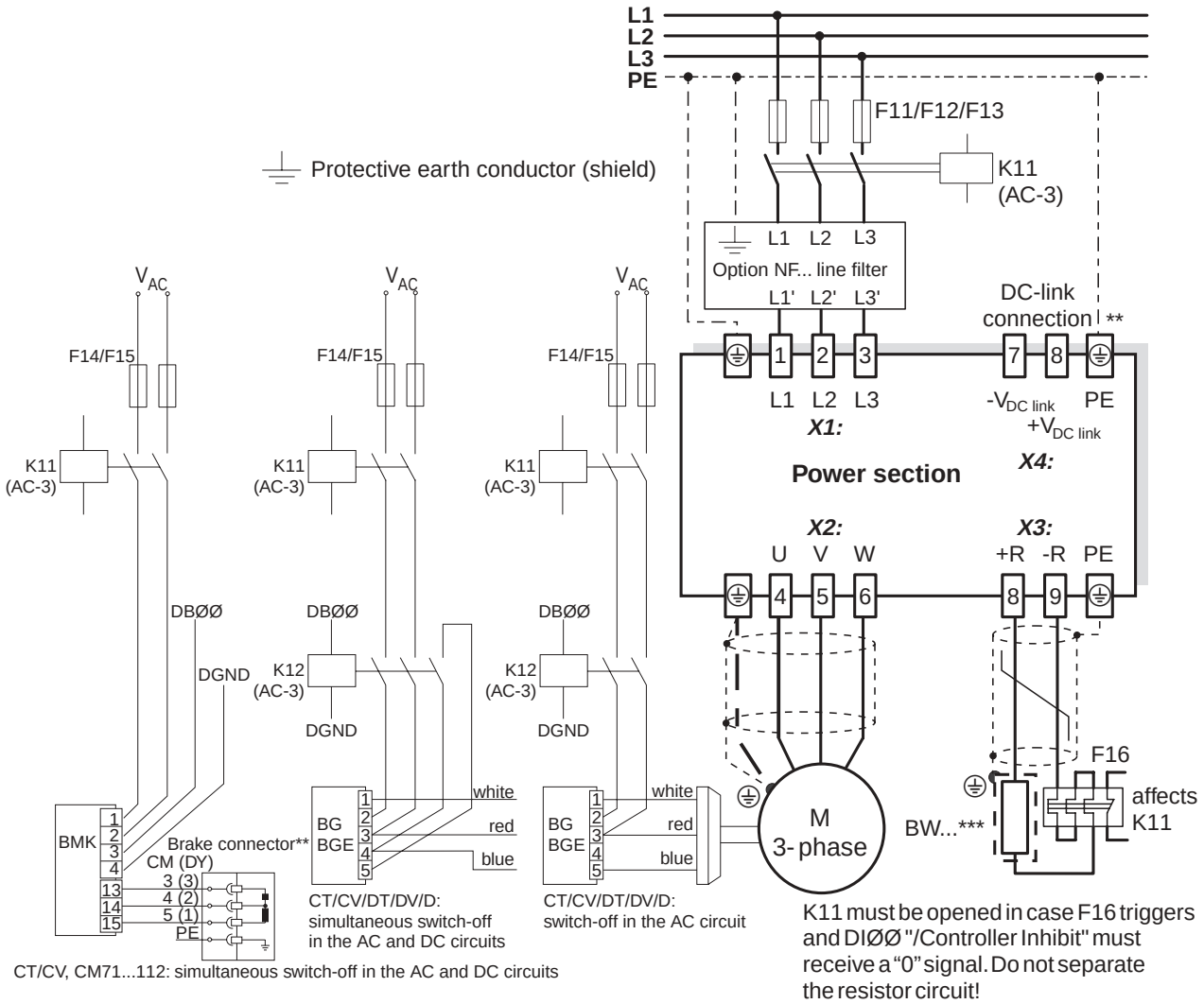
[2] Connection cover

[3] Screen (only sizes 4 and 5)

With installed touch guard, MOVIDRIVE® size 4, 5, and 6 units provide enclosure protection IP10, without touch guard IP00.

4.7 Wiring diagram for basic unit

Connection of power section and brake



* With sizes 1 and 2, there is no PE connection next to the input power terminals. In this case, use the PE terminal next to the DC link connection.

** **Important:** It is essential to adhere to the sequence of connections. Incorrect connection will lead to irreparable damage to the brake.

*** The BW090-P52B braking resistor is mounted to the side of the unit. BW090-P52B is equipped with an internal thermal overload protection. An additional bimetallic relay is not required.

A separate power supply line is required for connecting the brake rectifier. Powering it from the motor voltage is not permitted!

Always switch off the brake on the DC and AC sides with:

- all hoist applications
- drives which require a rapid brake reaction time and
- CFC and SERVO operating modes.

Brake rectifier in switch cabinet

Route the connection cables between the brake rectifier and the brake separately from other power cables when installing the brake rectifier in the switch cabinet. Joint routing is only permitted when the power cables are shielded.

Connection of electronics terminals

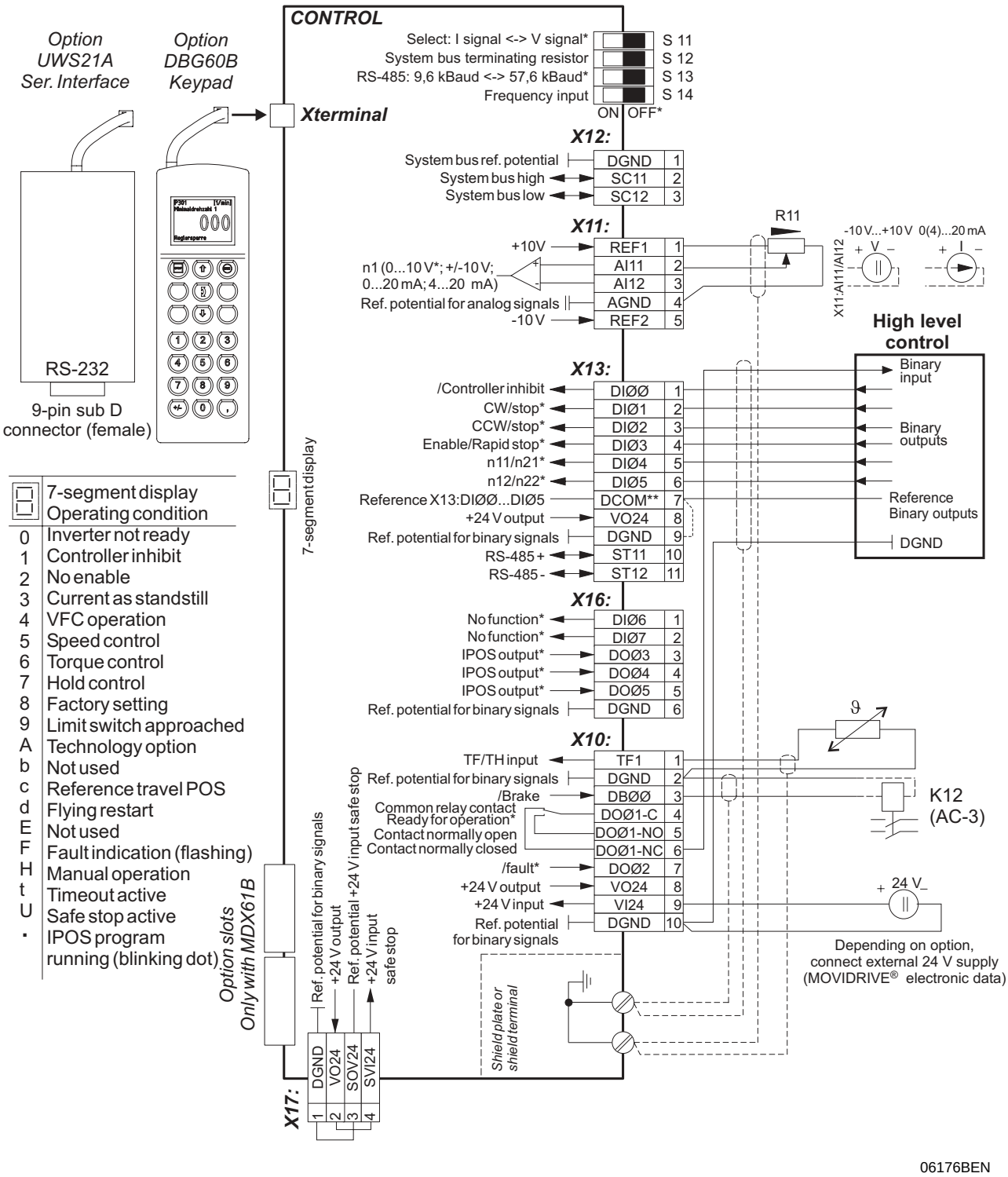


Figure 27: Wiring diagram of electronics terminals

* Factory setting

** If the binary inputs are connected to the DC 24 V voltage supply X13:8 "VO24", then X13:7 must be jumpered to X13:9 (DCOM to DGND) on MOVIDRIVE®.

Description of terminal functions on the basic unit (power section and control unit)

Terminal		Function	
X1:1/2/3 **X2:4/5/6** **X3:8/9** **X4:**	**L1/L2/L3/PE** **U/V/W/PE** **+R/-R/PE** **+U_Z/-U_Z/PE**	Power supply connection Motor connection Braking resistor connection DC link connection	
S11: **S12:** **S13:** **S14:**		Switch mode I signal (0(4) ... 20 mA) ↔ V signal (-10 V ... 0 ... 10 V, 0 ... 10 V), factory setting: V signal. Switch system bus terminating resistor on or off, factory setting: switched off. Set baud rate for the RS-485 interface. Either 9, 6 or 57.6 kBaud, factory setting: 75.6 kBaud. Switch frequency input on or off, factory setting: switched off.	
X12:1 **X12:2** **X12:3**	**DGND** **SC11** **SC12**	Reference potential system bus System bus high System bus low	
X11:1 **X11:2/3** **X11:4** **X11:5**	**REF1** **AI11/12** **AGND** **REF2**	+10 V (max. 3 mA) for setpoint potentiometer Setpoint input n1 (differential input or input with AGND reference potential), signal form → P11_ / S11 Reference potential for analog signals (REF1, REF2, AI.., AO..) -10 V (max. 3 mA) for setpoint potentiometer	
X13:1 **X13:2** **X13:3** **X13:4** **X13:5** **X13:6**	**DIØØ** **DIØ1** **DIØ2** **DIØ3** **DIØ4** **DIØ5**	Binary input 1, fixed assignment"/Controller inhibit" Binary input 2, factory setting "CW/stop" Binary input 3, factory setting "CCW/STOP" Binary input 4, factory setting "Enable/rapid stop" Binary input 5, factory setting "n11/n21" Binary input 6, factory setting "n12/n22"	• The binary inputs are electrically isolated by optocouplers. • Selection options for binary inputs 2 to 6 (DIØ1 ... DIØ5) → Parameter menu P60_
X13:7	**DCOM**	Reference for binary inputs X13:1 to X13:6 (DIØØ ... DIØ5) and X16:1/X16:2 (DIØ6 ... DIØ7) • Switching of binary inputs with +24 V external voltage: X13:7 (DCOM) must be connected to the reference potential of the external voltage. – Without jumper X13:7-X13:9 (DCOM-DGND) → Isolated binary inputs – With jumper X13:7-X13:9 (DCOM-DGND) → Non-isolated binary inputs • The binary inputs must be switched with +24 V from X13:8 or X10:8 (VO24) → Jumper required X13:7-X13:9 (DCOM-DGND).	
X13:8 **X13:9** **X13:10** **X13:11**	**VO24** **DGND** **ST11:** **ST12**	Auxiliary supply output +24 V (max. 200 mA) for external command switches Reference potential for binary signals RS-485+ RS-485-	
X16:1 **X16:2** **X16:3** **X16:4** **X16:5** **X16:6**	**DIØ6** **DIØ7** **DOØ3** **DOØ4** **DOØ5** **DGND**	Binary input 7, factory setting "no function" Binary input 8, factory setting "no function" Binary output 3, factory setting "IPOS output" Binary output 4, factory setting "IPOS output" Binary output 5, factory setting "IPOS output" **Do not apply an external voltage to binary outputs X16:3 (DOØ3) to X16:5 (DOØ5)!** Reference potential for binary signals	• The binary inputs are electrically isolated by optocouplers. • Selection options for binary inputs 7 to 8 (DIØ6/DIØ7) → Parameter menu P60_ • Selection options for binary inputs 3 to 5 (DOØ3...DOØ5) → Parameter menu P62_
X10:1 **X10:2** **X10:3** **X10:4** **X10:5** **X10:6** **X10:7**	**TF1** **DGND** **DBØØ** **DOØ1-C** **DOØ1-NO** **DOØ1-NC** **DOØ2**	TF/TH connection (connect to X10:2 via TF/TH), factory setting "No response" (→ P835) Reference potential for binary signals Binary output 0, with fixed assignment "/Brake", load capacity max. 150 mA (short-circuit proof) Shared contact binary output 1, factory setting "Ready" Normally open contact binary output 1, load capacity of the relay contacts max. DC 30 V and 0.8 A NC contact binary output 1 Binary output 2, factory setting "/Fault", load capacity max. 50 mA (short-circuit proof) Selection options for binary outputs 1 and 2 (DOØ1 and DOØ2) → Parameter menu P62_ **Do not apply an external voltage to binary outputs X10:3 (DBØØ) and X10:7 (DOØ2)!**	
X10:8 **X10:9** **X10:10**	**VO24** **VI24** **DGND**	Auxiliary supply output +24 V (max. 200 mA) for external command switches Input +24 V voltage supply (backup voltage depending on options, unit diagnosis when supply system off) Reference potential for binary signals	
X17:1 **X17:2** **X17:3** **X17:4**	**DGND** **VO24** **SOV24** **SVI24**	Reference potential for binary signals Auxiliary supply output +24 V (max. 200 mA) for external command switches Reference potential for +24 V input "Safe stop" (safety contact) +24 V input "Safe stop" (safety contact)	
Xterminal		Option slot for DBG60B keypad or serial port UWS21A (RS-232)	
		3 slots for option cards (size 0: 2 slots for option cards)	

X17: For safety applications, it is essential to observe the information in the publications "Safe disconnection for MOVIDRIVE® MDX60B/61B – Conditions" and "Safe disconnection for MOVIDRIVE® MDX60B/61B – Applications."

4.8 Assignment of braking resistors, chokes and filters

400/500 V units, size 0

MOVIDRIVE® MDX60/61B...-5A3			0005	0008	0011	0014
Size			0			
Braking resistors	**Trip current**	**Part number**				
BW090-P52B[1)]	-	824 563 0				
BW072-003	I_F = 0.6 A_{RMS}	826 058 3				
BW072-005	I_F = 1.0 A_{RMS}	826 060 5				
BW168	I_F = 2.5 A_{RMS}	820 604 X				
BW100-006	I_F = 1.8 A_{RMS}	821 701 7				
Line chokes		**Part numbers**				
ND020-013	ΣI_{mains} = AC 20 A	826 012 5				
Line filter		**Part number**				
NF009-503	V_{max} = AC 550 V	827 412 6				
Output chokes	**Inside diameter**	**Part number**				
HD001	d = 50 mm (1.97 in)	813 325 5	For cable cross sections 1.5 ... 16 mm^2 (AWG 16 ... 6)			
HD002	d = 23 mm (0.91 in)	813 557 6	For cable cross sections ≤ 1.5 mm^2 (AWG 16)			
Output filters (only in VFC mode)		**Part number**				
HF008-503		826 029 X		A		
HF015-503		826 030 3		B		A
HF022-503		826 031 1				B

1) Internal, thermal overload protection, no bimetallic relay required.

A **In rated operation (100 %)**

B **With variable torque load in VFC mode (125 %)**

400/500 V units, sizes 1, 2S, and 2

MOVIDRIVE® MDX61B...-5A3			0015	0022	0030	0040	0055	0075	0110
Size			1				2S		2
Braking resistors	**Trip current**	**Part number**							
BW100-005	I_F = 0.8 A_{RMS}	826 269 1							
BW100-006	I_F = 1.8 A_{RMS}	821 701 7							
BW168	I_F = 2.5 A_{RMS}	820 604 X							
BW268	I_F = 3.4 A_{RMS}	820 715 1							
BW147	I_F = 3.5 A_{RMS}	820 713 5							
BW247	I_F = 4.9 A_{RMS}	820 714 3							
BW347	I_F = 7.8 A_{RMS}	820 798 4							
BW039-012	I_F = 4.2 A_{RMS}	821 689 4							
BW039-026	I_F = 7.8 A_{RMS}	821 690 8							
BW039-050	I_F = 11 A_{RMS}	821 691 6							
Line chokes		**Part numbers**							
ND020-013	ΣI_{mains} = AC 20 A	826 012 5							
ND045-013	ΣI_{mains} = AC 45 A	826 013 3							
Line filter		**Part number**							
NF009-503	V_{max} = AC 550 V	827 412 6				A			
NF014-503		827 116 X				B		A	
NF018-503		827 413 4						B	
NF035-503		827 128 3							
Output chokes	**Inside diameter**	**Part number**							
HD001	d = 50 mm (1.97 in)	813 325 5	for cable cross sections 1.5 ... 16 mm^2 (AWG 16 ... 6)						
HD002	d = 23 mm (0.91 in)	813 557 6	for cable cross sections ≤ 1.5 mm^2 (AWG 16)						
HD003	d = 88 mm (4.46 in)	813 558 4	for cable cross sections > 16 mm^2 (AWG 6)						
Output filters (only in VFC mode)		**Part number**							
HF015-503		826 030 3	A						
HF022-503		826 031 1	B	A					
HF030-503		826 032 X		B	A				
HF040-503		826 311 6			B	A			
HF055-503		826 312 4				B	A		
HF075-503		826 313 2					B	A	
HF023-403		825 784 1						B	A
HF033-403		825 785 X							B

A **In rated operation (100 %)**

B **With variable torque load in VFC mode (125 %)**

400/500 V units, sizes 3 to 6

MOVIDRIVE® MDX61B...-503			0150	0220	0300	0370	0450	0550	0750	0900	1100	1320
Size			3			4		5		6		
Braking resistors	**Trip current**	**Part number**										
BW018-015	I_F = 4.0 A_{RMS}	821 684 3				C	C					
BW018-035	I_F = 8.1 A_{RMS}	821 685 1				C	C					
BW018-075	I_F = 14 A_{RMS}	821 686 X				C	C					
BW915	I_F = 28 A_{RMS}	821 260 0										
BW012-025	I_F = 6.1 A_{RMS}	821 680 0										
BW012-050	I_F = 12 A_{RMS}	821 681 9										
BW012-100	I_F = 22 A_{RMS}	821 682 7										
BW106	I_F = 38 A_{RMS}	821 050 0								C	C	C
BW206	I_F = 42 A_{RMS}	821 051 9								C	C	C
Line chokes		**Part numbers**										
ND045-013	ΣI_{mains} = AC 45 A	826 013 3		A								
ND085-013	ΣI_{mains} = AC 85 A	826 014 1		B			A					
ND1503	ΣI_{mains} = AC 150 A	825 548 2					B					
ND300-005	ΣI_{mains} = AC 300 A	827 721 4										
Line filter		**Part number**										
NF035-503	V_{max} = AC 550 V	827 128 3	A									
NF048-503		827 117 8	B	A								
NF063-503		827 414 2		B	A							
NF085-503		827 415 0			B		A					
NF115-503		827 416 9					B	A				
NF150-503		827 417 7						B				
NF210-503		827 418 5									A	
NF300-503		827 419 3									B	
Output chokes	**Inside diameter**	**Part number**										
HD001	d = 50 mm (1.97 in)	813 325 5	for cable cross sections 1.5...16 mm² (AWG 16...6)									
HD003	d = 88 mm (4.46 in)	813 558 4	for cable cross sections > 16 mm² (AWG 6)									
HD004	Connection with M12 bolt	816 885 7										
Output filters (only in VFC mode)		**Part number**										
HF033-403		825 785 X	A	B / D	A / D							
HF047-403		825 786 8	B	A								
HF450-503		826 948 3			B		E	D	D			

A In rated operation (100 %)

B With variable torque load in VFC mode (125 %)

C Connect two braking resistors in parallel and set twice the trip current on F16 ($2 \times I_F$)

D Connect two output filters in parallel

E In rated operation (100 %): One output filter
With variable torque load (125 %): Connect two output filters in parallel

230 V units, sizes 1 to 4

MOVIDRIVE® MDX61B...-2_3			0015	0022	0037	0055	0075	0110	0150	0220	0300
Size			1			2		3		4	
Braking resistors	**Trip current**	**Part number**									
BW039-003	I_F = 2.0 A_{RMS}	821 687 8									
BW039-006	I_F = 3.2 A_{RMS}	821 688 6									
BW039-012	I_F = 4.2 A_{RMS}	821 689 4									
BW039-026	I_F = 7.8 A_{RMS}	821 690 8									
BW027-006	I_F = 2.5 A_{RMS}	822 422 6									
BW027-012	I_F = 4.4 A_{RMS}	822 423 4									
BW018-015	I_F = 4.0 A_{RMS}	821 684 3						C	C	C	C
BW018-035	I_F = 8.1 A_{RMS}	821 685 1						C	C	C	C
BW018-075	I_F = 14 A_{RMS}	821 686 X						C	C	C	C
BW915	I_F = 28 A_{RMS}	821 260 0						C	C	C	C
BW012-025	I_F = 10 A_{RMS}	821 680 0									
BW012-050	I_F = 19 A_{RMS}	821 681 9									
BW012-100	I_F = 27 A_{RMS}	821 682 7									
BW106	I_F = 38 A_{RMS}	821 050 0								C	C
BW206	I_F = 42 A_{RMS}	821 051 9								C	C
Line chokes		**Part number**									
ND020-013	ΣI_{mains} = AC 20 A	826 012 5				A					
ND045-013	ΣI_{mains} = AC 45 A	826 013 3				B		A			
ND085-013	ΣI_{mains} = AC 85 A	826 014 1						B		A	
ND1503	ΣI_{mains} = AC 150 A	825 548 2								B	
Line filter		**Part number**									
NF009-503	UV_{max} = AC 550 V	827 412 6		A							
NF014-503		827 116 X		B	A						
NF018-503		827 413 4			B						
NF035-503		827 128 3									
NF048-503		827 117 8						A			
NF063-503		827 414 2						B			
NF085-503		827 415 0								A	
NF115-503		827 416 9								B	
Output chokes	**Inside diameter**	**Part number**									
HD001	d = 50 mm (1.97 in)	813 325 5	for cable cross sections 1.5 ... 16 mm^2 (AWG 16 ... 6)								
HD002	d = 23 mm (0.91 in)	813 557 6	for cable cross sections ≤ 1.5 mm^2 (AWG 16)								
HD003	d = 88 mm (4.46 in)	813 558 4	for cable cross sections > 16 mm^2 (AWG 6)								

A **In rated operation (100 %)**

B **With variable torque load in VFC mode (125 %)**

C **Connect two braking resistors in parallel and set twice the trip current on F16 ($2 \times I_F$)**

4.9 Connection of system bus (SBus 1)

Only when P816 "SBus baud rate" = 1000 kbaud:

MOVIDRIVE® *compact* MCH4_A units are not allowed to be combined with other MOVIDRIVE® units in the same system bus combination.

The units are allowed to be combined at baud rates ≠ 1000 kbaud.

Max. 64 CAN bus stations can be interconnected using the system bus (SBus). The SBus supports transmission systems compliant with ISO 11898.

The "Serial Communication" manual contains detailed information about the system bus. This manual can be obtained from SEW-EURODRIVE.

Wiring diagram SBus

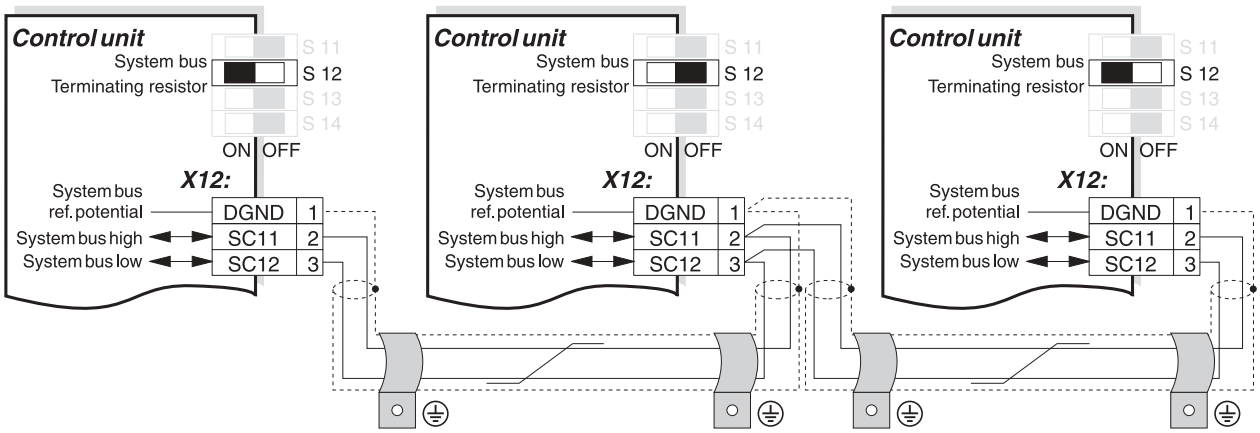


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Figure 28: System bus connection

Cable specification

- Use a 2-core twisted and shielded copper cable (data transmission cable with braided copper shield). The cable must meet the following specifications:
  - Conductor cross section 0.75 mm^2 (AWG 18)
  - Cable resistance 120 Ω at 1 MHz
  - Capacitance per unit length ≤ 40 pF/m (12 pF/ft) at 1 kHz

  Suitable cables include CAN bus or DeviceNet cables.

Shield contact

- Connect the shield at either end to the electronics shield clamp of the inverter or the master control and ensure the shield is connected over a large area. Also connect the ends of the shield to DGND. As a result, the separation of PE and DGND is canceled.

Cable length

- The permitted total cable length depends on the baud rate setting of the SBus (P816):
  - 125 kBaud → 320 m (1,056 ft)
  - 250 kBaud → 160 m (528 ft)
  - **500 kbaud → 80 m (264 ft)**
  - 1000 kBaud → 40 m (132 ft)

Terminating resistor

- Switch on the system bus terminating resistor (S12 = ON) at the start and end of the system bus connection. Switch off the terminating resistor on the other units (S12 = OFF).

- There must not be any difference of potential between the units connected with the SBus. Take suitable measures to avoid a difference of potential, such as connecting the unit ground connectors using a separate lead.

4.10 Connection of RS-485

The RS-485 interface can be used for connecting max. 32 MOVIDRIVE® units, e.g. for master/slave operation, or 31 MOVIDRIVE® units and a master control system (PLC).

Wiring diagram RS-485 interface

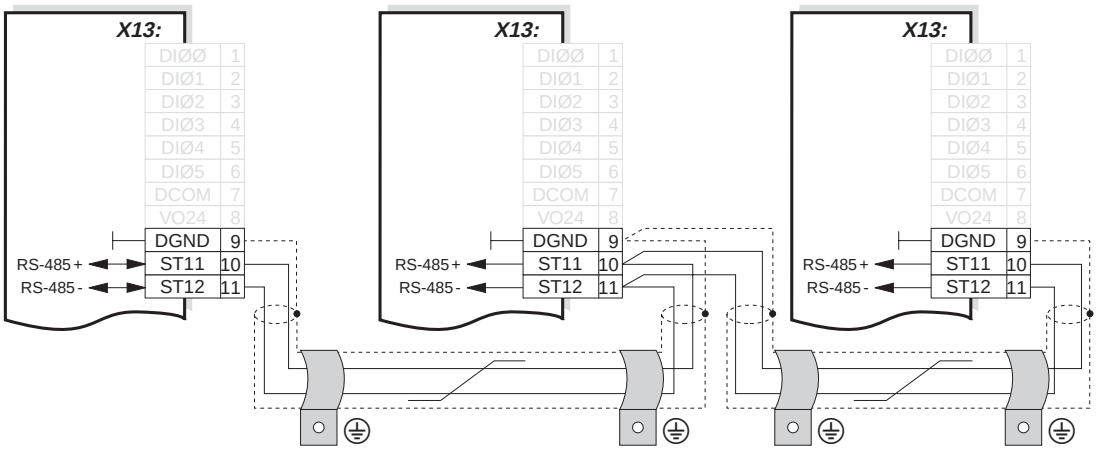

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Figure 29: RS-485 connection

Cable specification

- Use a 2-core twisted and shielded copper cable (data transmission cable with braided copper shield). The cable must meet the following specifications:
  - Conductor cross section 0.5 ... 0.75 mm^2 (AWG 20 ... 18)
  - Cable resistance 100 ... 150 Ω at 1 MHz
  - Capacitance per unit length ≤ 40 pF/m (12 pF/ft) at 1 kHz

  The following cable is suitable, for example:
  - BELDEN (www.belden.com), data cable type 3105A

Shield contact

- Connect the shield at either end to the electronics shield clamp of the inverter or the higher-level control and ensure the shield is connected over a large area. Also connect the ends of the shield to DGND. As a result, the separation of PE and DGND is canceled.

Cable length

- The permitted total cable length is 200 m (660 ft).

Terminating resistor

- Dynamic terminating resistors are installed. Do not connect **any external terminating resistors**!

- There must not be any difference of potential between the units which are connected together using the RS-485. Take suitable measures to avoid a difference of potential, such as connecting the unit ground connectors using a separate lead.

4.11 Connection of UWS21A option (RS-232)

Part number UWS21A: 823 077 3

Connection of MOVIDRIVE® and UWS21A

- Use the supplied connection cable for connecting the UWS21A option to the MOVIDRIVE® unit.
- Plug the connection cable into the Xterminal socket of the MOVIDRIVE® unit.
- Note that the DBG60B keypad and the UWS21A serial interface cannot be connected to the MOVIDRIVE®at the same time.

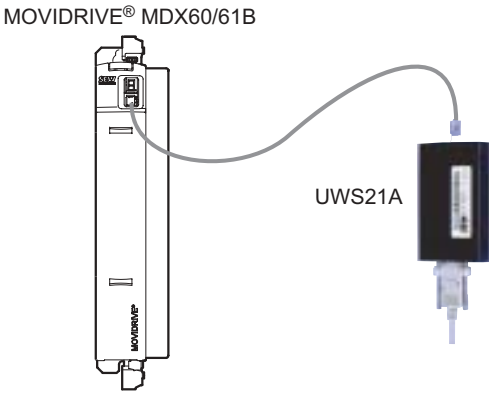

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Figure 30: Connection cable between MOVIDRIVE® and UWS21A

Connection of UWS21A and PC

- Use the supplied connection cable (shielded RS-232 standard interface cable) for connecting the UWS21A option to the PC.

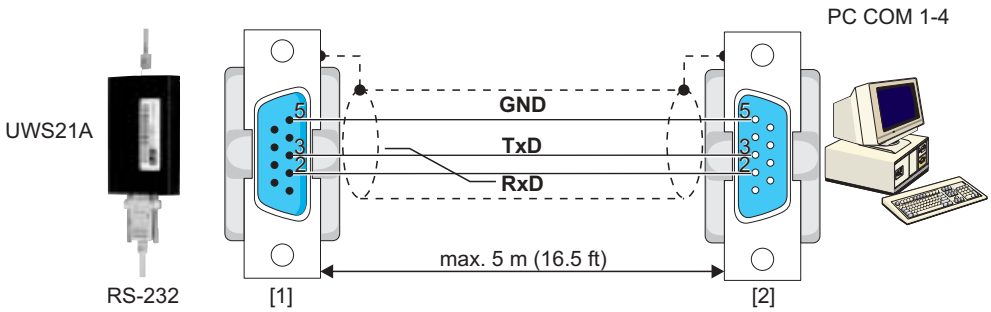

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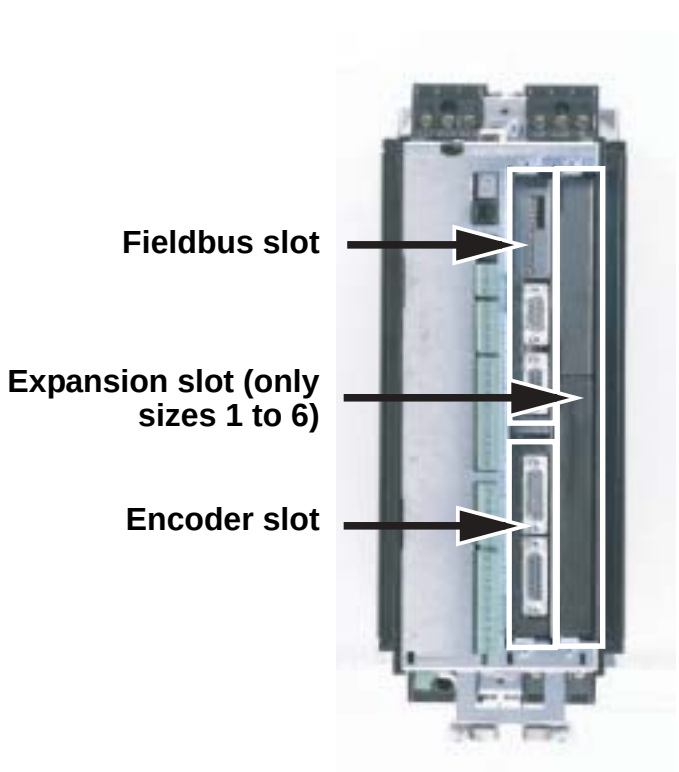
Figure 31: UWS21A-PC connection cable (1:1 connection assignment)

[1] 9-pin sub D plug

[2] 9-pin sub D socket

4.12 Option combinations for MDX61B sizes 0 to 6

Location of option slots



Combination possibilities of option cards for MDX61B sizes 0 to 6

The option cards are different in size and can only be installed in the matching option slots. The following list shows the combination possibilities of option cards for MOVIDRIVE® MDX61B sizes 0 to 6.

Option card	Designation	MOVIDRIVE® MDX61B		
		Encoder slot	Fieldbus slot	Expansion slot
DEH11B	Encoder input incr. / Hiperface	X		
DER11B	Encoder input resolver / Hiperface	X		
DFP21B	Fieldbus interface Profibus		X	
DFI11B	Fieldbus interface Interbus		X	
DFI21B[1)]	Fieldbus interface Interbus LWL		X	
DFD11B[1)]	DeviceNet fieldbus interface		X	
DFC11B[1)]	Fieldbus interface CAN/CANopen		X	
DIO11B	I/O expansion (only sizes 1 to 6)		X	X
DRS11B[1)]	Phase-synchronous operation			X
DIP11B[1)]	SSI encoder interface			X

1) In preparation

4.13 Installing and removing option cards

MOVIDRIVE® MDX61B sizes 1 to 6 allow for installing or removing three option cards.

Before you begin

Observe the following notes before installing or removing an option card:

- De-energize the inverter. Switch off the DC 24 V and the supply voltage.
- Take appropriate measures to protect the option card from electrostatic charge (use discharge strap, conductive shoes, etc.) before touching it.
- **Before installing the option card**, remove the keypad (→ Sec. " Removing / replacing the keypad") and the front cover (→ Sec. "Removing / replacing the front cover").
- **After having installed the option card**, replace the keypad (→ Sec. " Removing / replacing the keypad") and the front cover (→ Sec. "Removing / replacing the front cover").
- Keep the option card in its original packaging. Do not remove the option card from the packaging until immediately before you are ready to install it.
- Hold the option card by its edges only. Do not touch any components.

Installing and removing an option card

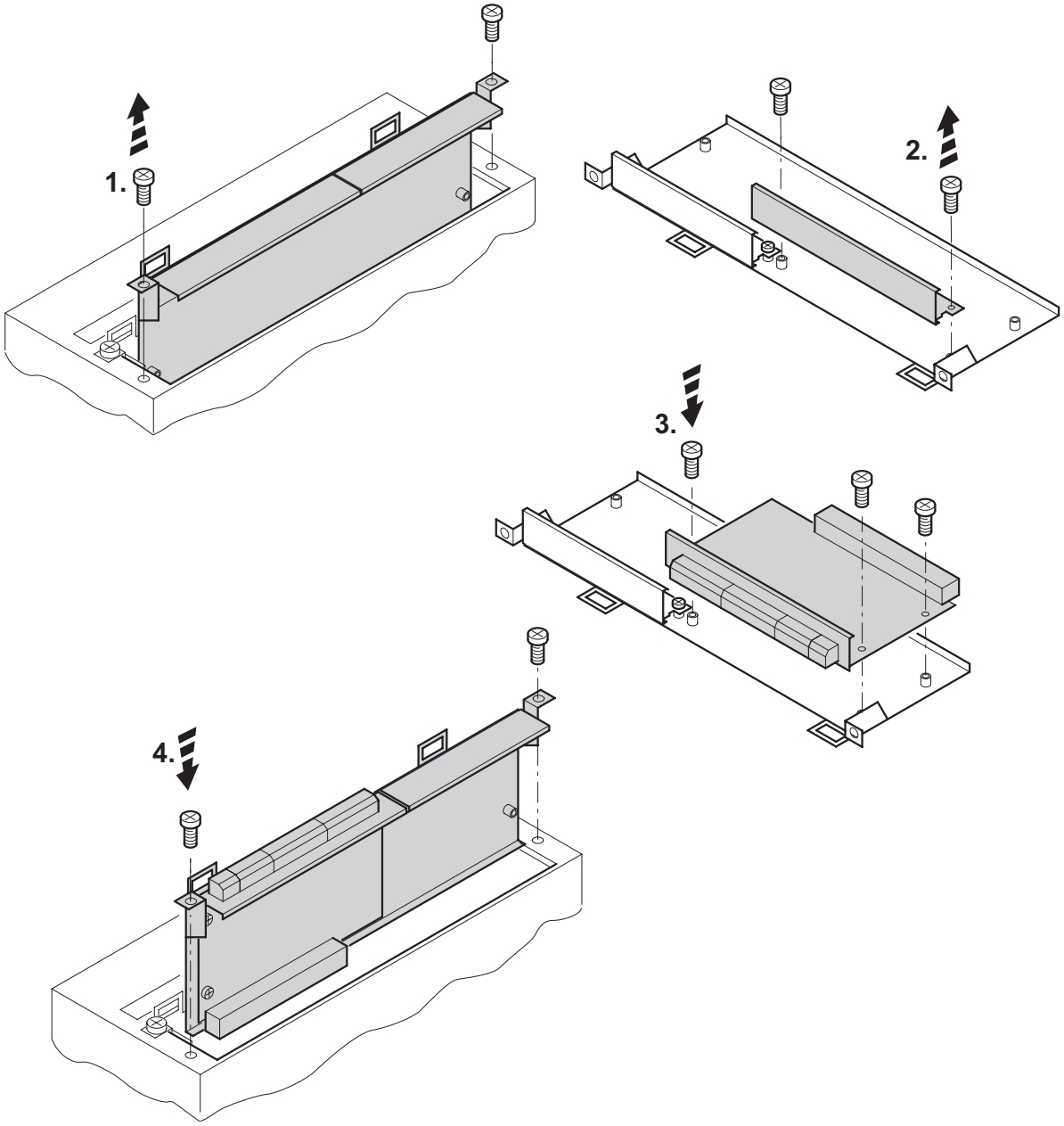


Figure 32: Installing an option card in MOVIDRIVE® MDX61B sizes 1 to 6

1. Remove the two retaining screws holding the card retaining bracket. Evenly pull the card retaining bracket out from the slot (do not twist!).
2. Remove the two retaining screws of the black cover plate on the card retaining bracket. Remove the black cover plate.
3. Position the option card onto the retaining bracket so that the three retaining screws fit into the corresponding holes on the card retaining bracket.
4. Insert the retaining bracket with installed option card into the slot, pressing slightly so it is seated properly. Secure the card retaining bracket with the two retaining screws.
5. To remove the option card, follow the instructions in reverse order.

4.14 Connection of encoder and resolver

The wiring diagrams do not show the view onto the cable end but

- with plugs / sockets: View on motor plugs / sockets
- With unit sockets: View on unit socket

The conductor colors specified in the wiring diagrams are in accordance with IEC 757 and correspond to the conductor colors used in the pre-fabricated cables from SEW.

For more details, refer to the "SEW Encoder Systems" manual, which can be obtained from SEW.

General installation notes

- Max. line length of inverter encoder/resolver: 100 m (330 ft) with a capacitance per unit length ≤ 120 nF/km (193 nF/mile).
- Core cross section: 0.20 ... 0.5 mm^2 (AWG 24 ... 20)
- If you cut off a core of the encoder/resolver cable: Isolate the cut-off end of the core.
- Use shielded cables with twisted pairs of insulated conductors and connect the shield at both ends
  - to the encoder in the cable gland or in the encoder plug
  - to the inverter in the housing of the sub D plug
- Route the encoder/resolver cable separately from the power cables.

Shielding

Connect the shield of the encoder/resolver cable over a large area.

On the inverter

Connect the shield on the inverter end in the housing of the sub D plug.

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Figure 33: Connect the shield in the sub D connector

On the encoder/ resolver

Connect the shield on the encoder / resolver end only to the specific earth clips and not in the cable gland. For drives with plug connector, apply the shield in the encoder plug.

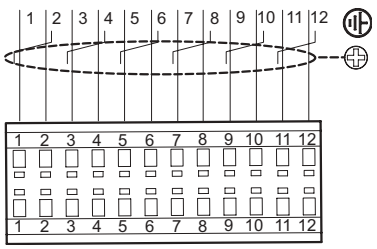

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Figure 34: Connect the shield in the earth clip of the encoder

Pre-fabricated cables

- SEW-EURODRIVE offers pre-fabricated cables for connecting encoders/resolvers. We recommend using these pre-fabricated cables.

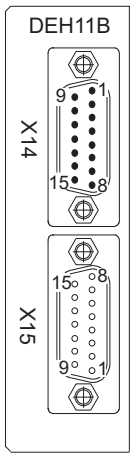
4.15 Connection of DEH11B (HIPERFACE®) option

Part number

HIPERFACE® encoder card type DEH11B option 824 310 7

The "HIPERFACE® encoder card type DEH11B" option is only possible in conjunction with MOVIDRIVE® MDX61B, not with MDX60B.

The DEH11B option must be plugged into the encoder slot.

Front view of DEH11B	Description	Terminal	Function
 06198AXX	**X14: Input of external encoder or output of incremental encoder simulation** **Connection → page 47 and page 50** **Pulse count of the incremental encoder simulation:** • **1024 pulses/revolution with HIPERFACE® encoder on X15** • **as on X15: Motor encoder input with sin/cos encoder or TTL sensor on X15**	**X14:1** **X14:2** **X14:3** **X14:4** **X14:5/6** **X14:7** **X14:8** **X14:9** **X14:10** **X14:11** **X14:12** **X14:13/14** **X14:15**	(COS+) Signal track A (K1) (SIN+) Signal track B (K2) Signal track C (K0) DATA+ Reserved Switchover Reference potential DGND (COS–) Signal track A (K1) (SIN–) Signal track B (K2) Signal track C (K0) DATA- Reserved +12 V (max. 180 mA)
	X15: Motor encoder input	**X15:1** **X15:2** **X15:3** **X15:4** **X15:5** **X15:6** **X15:7** **X15:8** **X15:9** **X15:10** **X15:11** **X15:12** **X15:13** **X15:14** **X15:15**	(COS+) Signal track A (K1) (SIN+) Signal track B (K2) Signal track C (K0) DATA+ Reserved Reference potential TF/TH Reserved Reference potential DGND (COS–) Signal track A (K1) (SIN–) Signal track B (K2) Signal track C (K0) DATA- Reserved TF/TH connection (connect to X15:6 via TF/TH) +12 V (max. 180 mA)

Important notes

- The connections on X14 and X15 must not be plugged or removed during operation. De-energize the inverter before plugging or removing the encoder connections. Switch off the supply voltage and the DC 24 V (X10:9) for this purpose.
- If X14 is used as incremental encoder simulation output, the switchover (X14:7) must be jumpered with DGND (X14:8).
- The DC 12 V supply from X14 and X15 is sufficient to operate SEW encoders with a DC 24 V supply.
- Do not connect HTL encoders.

Permitted encoders

The following encoders may be connected to the "HIPERFACE® encoder card type DEH11B" option:

- HIPERFACE® encoder type AS1H, ES1H or AV1H
- sin/cos encoder type ES1S, ES2S or EV1S
- 5 V TTL sensor with DC 24 V voltage supply type ES1R, ES2R or EV1R
- 5 V TTL sensor with DC 5 V voltage supply type ES1T, ES2T or EV1T via DWI11A option.

HIPERFACE® encoder connection

HIPERFACE® encoders AS1H, ES1H and AV1H are recommended for operation with DEH11B. Depending on the motor type and motor configuration, the encoder is connected via plug connector or terminal box.

DT../DV.., DS56, CT../CV.., CM71...112 with plug connector

Connect the HIPERFACE® encoder as follows:

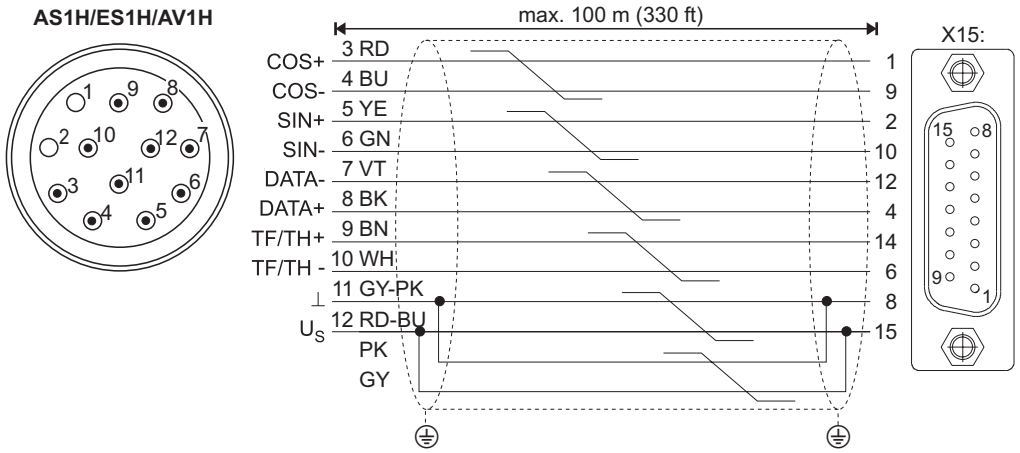


Figure 35: Connecting HIPERFACE® encoder to DEH11B as a motor encoder

Important for DT/DV or CT/CV motors: The TF or TH is **not** connected with the encoder cable but must be connected using an additional 2-core shielded cable.

Part numbers of the pre-fabricated cables:

- For fixed routing: 1332 453 5
- For cat track routing: 1332 455 1

Part numbers of the pre-fabricated extension cables:

- For fixed routing: 199 539 1
- For cat track routing: 199 540 5

CM71...112 with terminal box

Connect the HIPERFACE® encoder as follows:

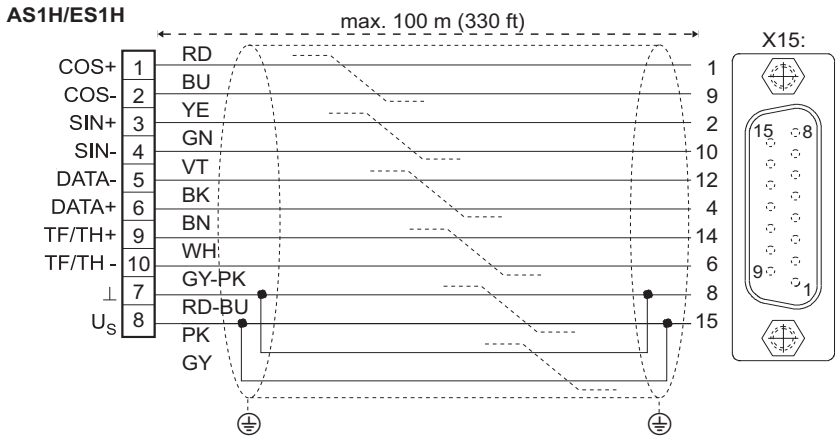


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Figure 36: Connecting HIPERFACE® encoder to DEH11B as a motor encoder

Part numbers of the pre-fabricated cables:

- For fixed routing: 1332 457 8
- For cat track routing: 1332 454 3

Connecting sin/cos encoder to DT../DV.., CT../CV motors

The high resolution sin/cos encoders ES1S, ES2S or EV1S can also be connected to DEH11B. Connect the sin/cos encoder as follows:

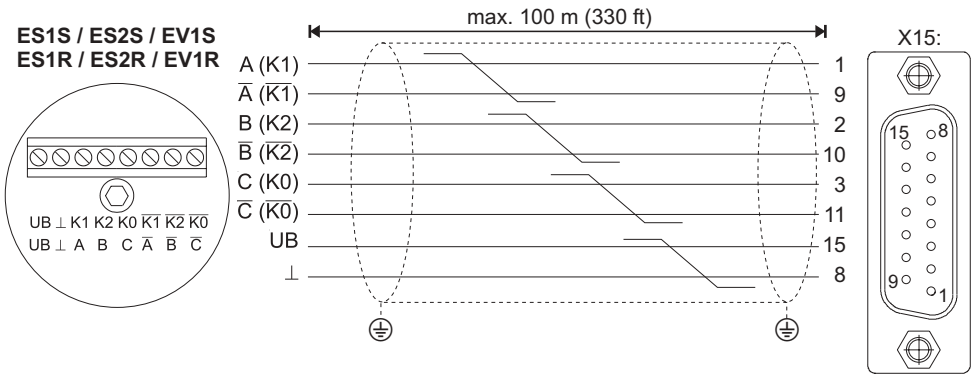

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Figure 37: Connecting the sin/cos encoder to DEH11B as a motor encoder

Part numbers of the pre-fabricated cables:

- For fixed routing: 1332 459 4
- For cat track routing: 1332 458 6

Connecting TTL encoders to DT../ DV.. motors

TTL sensors from SEW-EURODRIVE are available with DC 24 V and DC 5 V voltage supply.

DC 12...24 V voltage supply

Connect the TTL encoders with DC 12 ... 24 V voltage supply type ES1R, ES2R or EV1S in the same way as the high-resolution sin/cos encoders (→ Figure 37).

DC 5 V voltage supply

TTL sensors with DC 5 V voltage supply type ES1T, ES2T or EV1T must be connected via the "5 V encoder power supply type DWI11A" option (part number 822 759 4). The sensor cable must be connected as well to correct the supply voltage of the encoder. Connect these encoders as follows:

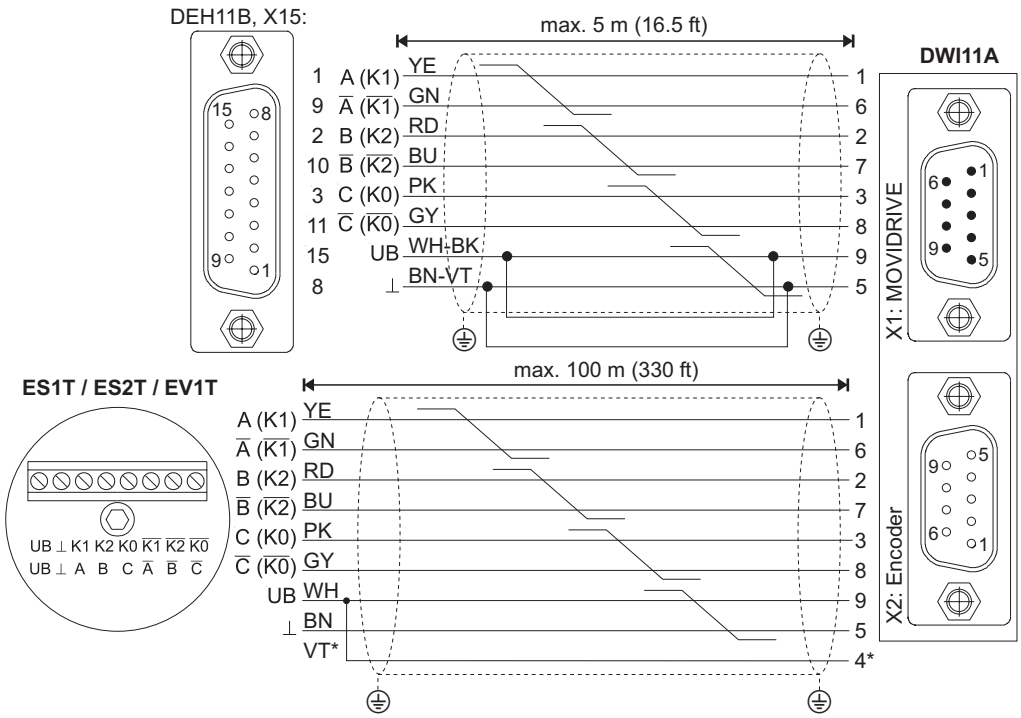
DEH11B, X15:
max. 5 m (16.5 ft)
DWI11A
1 A (K1) YE 1
9 Ā (K1) GN 6
2 B (K2) RD 2
10 B̄ (K2) BU 7
3 C (K0) PK 3
11 C̄ (K0) GY 8
15 UB WH-BK 9
8 ⊥ BN-VT 5
X1: MOVIDRIVE
ES1T / ES2T / EV1T
max. 100 m (330 ft)
UB ⊥ K1 K2 K0 K̄1 K̄2 K̄0
UB ⊥ A B C Ā B̄ C̄
A (K1) YE 1
Ā (K1) GN 6
B (K2) RD 2
B̄ (K2) BU 7
C (K0) PK 3
C̄ (K0) GY 8
UB WH 9
⊥ BN 5
VT* 4*
X2: Encoder

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Figure 38: Connecting the TTL sensor via DWI11A to DEH11B as a motor encoder

* Connect the sensor cable (VT) on the encoder to UB, do not jumper on the DWI11A!

Part numbers of the pre-fabricated cables:

- HIPERFACE® encoder card type DEH11B X15 option: → DWI11A X1:MOVIDRIVE®
  - For fixed routing: 817 957 3
- Encoder ES1T / ES2T / EV1T → DWI11A X2:Encoder
  - For fixed routing: 198 829 8
  - For cat track routing 198 828 X

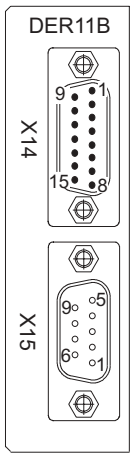
4.16 Connection of DER11B option (resolver)

Part number

Resolver card type DER11B option: 824 307 7

The "resolver card type DER11B" option is only possible in conjunction with MOVIDRIVE® MDX61B, not with MDX60B.

The DER11B option must be plugged into the encoder slot.

Front view of DER11B	Description	Terminal	Function
 06199AXX	**X14: Input of external encoder or output of incremental encoder simulation** **Connection → page 47 and page 50** **The pulse count of the incremental encoder simulation is always 1024 pulses per revolution**	**X14:1** **X14:2** **X14:3** **X14:4** **X14:5/6** **X14:7** **X14:8** **X14:9** **X14:10** **X14:11** **X14:12** **X14:13/14** **X14:15**	(cos) Signal track A (K1) (sin) Signal track B (K2) Signal track C (K0) DATA+ Reserved Switchover Reference potential DGND (cos–) Signal track A (K1) (sin–) Signal track B (K2) Signal track C (K0) DATA- Reserved +12 V (max. 180 mA)
	X15: Resolver input	**X15:1** **X15:2** **X15:3** **X15:4** **X15:5** **X15:6** **X15:7** **X15:8** **X15:9**	sin+ (S2) cos+ (S1) Ref.+ (R1) N.C. Reference potential TF/TH sin– (S4) cos– (S3) Ref.– (R2) TF/TH connection (connect to X15:5 via TF/TH)

Important notes

- The connections on X14 and X15 must not be plugged or removed during operation. De-energize the inverter before plugging or removing the encoder connections. Switch off the supply voltage and the DC 24 V (X10:9).
- If X14 is used as an incremental encoder simulation output, the switchover (X14:7) must be jumpered with DGND (X14:8).
- The DC 12 V supply from X50 is sufficient to operate SEW encoders with a DC 24 V supply.
- Do not connect HTL encoders.

Permitted encoders

The following encoders can be connected to the "resolver card type DER11B" option:

On X14: External encoder input:

- HIPERFACE® encoder type AS1H, ES1H or AV1H
- sin/cos encoder type ES1S, ES2S or EV1S
- 5 V TTL sensor with DC 24 V voltage supply type ES1R, ES2R or EV1R
- 5 V TTL sensor with DC 5 V voltage supply type ES1T, ES2T or EV1T via DWI11A option

On X15: Resolver input:

- 2-pole resolver, 7 $V_{AC\_r.m.s.}$, 7 kHz

Resolver

SEW-EURODRIVE offers the following pre-fabricated cables for connecting resolvers to DER11B:

For motor type		Part number	
		Fixed routing	Cat track routing
DS56 CM71 ... 112	**with plug connector**	199 487 5	199 319 4
	extension cable	199 542 1	199 541 3
	with terminal box	199 589 8	199 590 1
DY71 ... 112	**with plug connector**	198 827 1	198 812 3

Terminal/pin assignment

CM motors: The resolver connections are accommodated in a plug connector or on the 10-pin Wago terminal strip.

DS/DY motors: The resolver connections in the terminal box are either accommodated on a 10-pin Phoenix terminal strip or in the plug connector.

Plug connectors CM, DS56: Intercontec, type ASTA021NN00 10 000 5 000

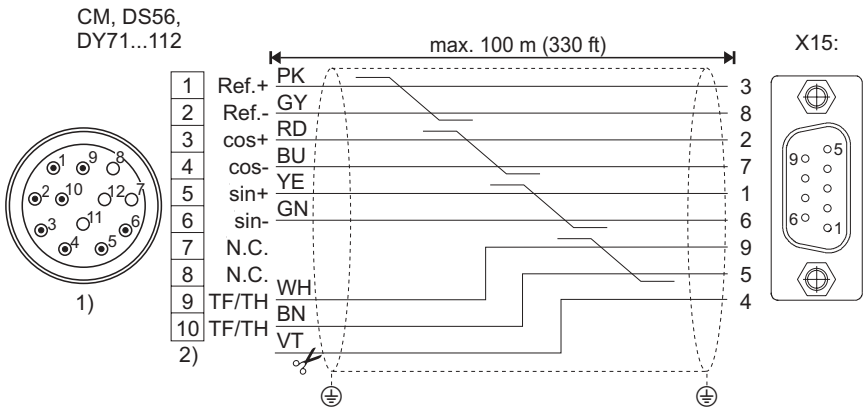
Plug connectors DY71 ... 112:Framatome Souriou, type GN-DMS2-12 (compatible to Intercontec)

Terminal / pin	Description		Conductor color in pre-fabricated cable
1	Ref.+	Reference	Pink (PK)
2	Ref.-		Gray (GY)
3	cos+	Cosine signal	Red (RD)
4	cos-		Blue (BU)
5	sin+	Sine signal	Yellow (YE)
6	sin-		Green (GN)
9	TF/TH	Motor protection	White (WH)
10	TF/TH		Brown (BN)

The resolver signals have the same numbering on the 10-pin Phoenix terminal strip and in the plug connectors.

Connection

Connect the resolver as follows:



06557AXX

Figure 39: Connecting the resolver

1) Plug connector

2) Terminal strip

If using the pre-fabricated cable with conductor end sleeves, cut off the violet conductor (VT) of the cable in the motor terminal box.

4.17 External encoder connection

External encoders

The following external encoders can be connected to connector X14 of the DEH11B option and the DER11B option.

- HIPERFACE® encoder AV1H
- High-resolution sin/cos encoders with signal voltage 1 V_{SS}
- 5 V TTL sensors with signal level to RS-422

Voltage supply

SEW encoders with DC 12 ... 24 V voltage supply (max. 180 mA) are connected directly to X14:. These SEW encoders are then powered by the inverter.

SEW encoders with DC 5 V supply must be connected via the "5 V encoder power supply type DWI11A" option (part number 822 759 4).

Connecting HIPERFACE® encoder AV1H

Connect the HIPERFACE® encoder AV1H as follows:

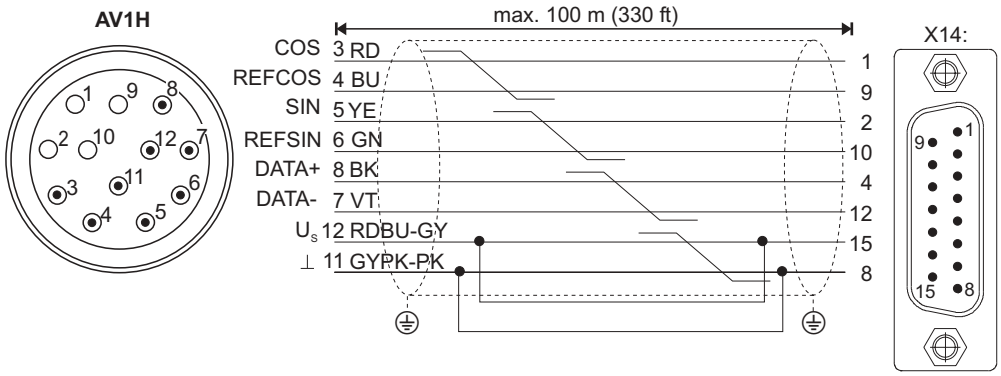


Figure 40: Connecting HIPERFACE® encoder AV1H to DEH11B/DER11B as external encoder

Part numbers of the pre-fabricated cables:

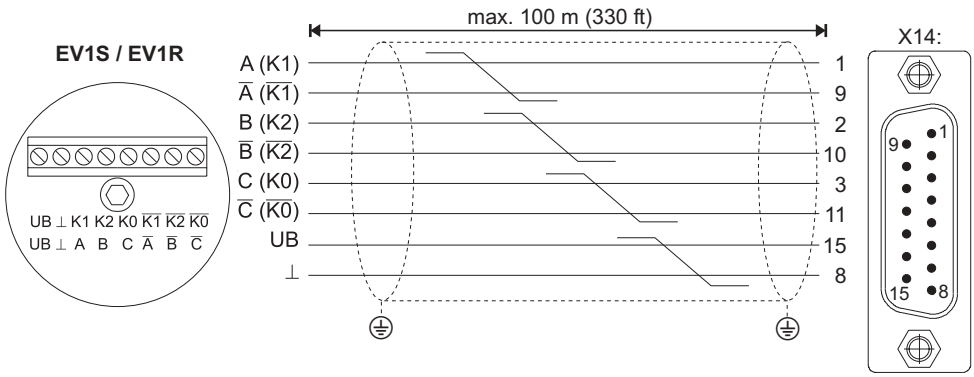
- For fixed routing: 818 015 6
- For cat track routing: 818 165 9

Part numbers of the pre-fabricated extension cables:

- For fixed routing: 199 539 1
- For cat track routing: 199 540 5

Sin/cos encoder connection

Connect the sin/cos encoder as follows:



06230BXX

Figure 41: Connecting the sin/cos encoder to DEH11B/DER11B as an external encoder

Part numbers of the pre-fabricated cables:

- For fixed routing: 817 960 3
- For cat track routing: 818 168 3

TTL sensor connection

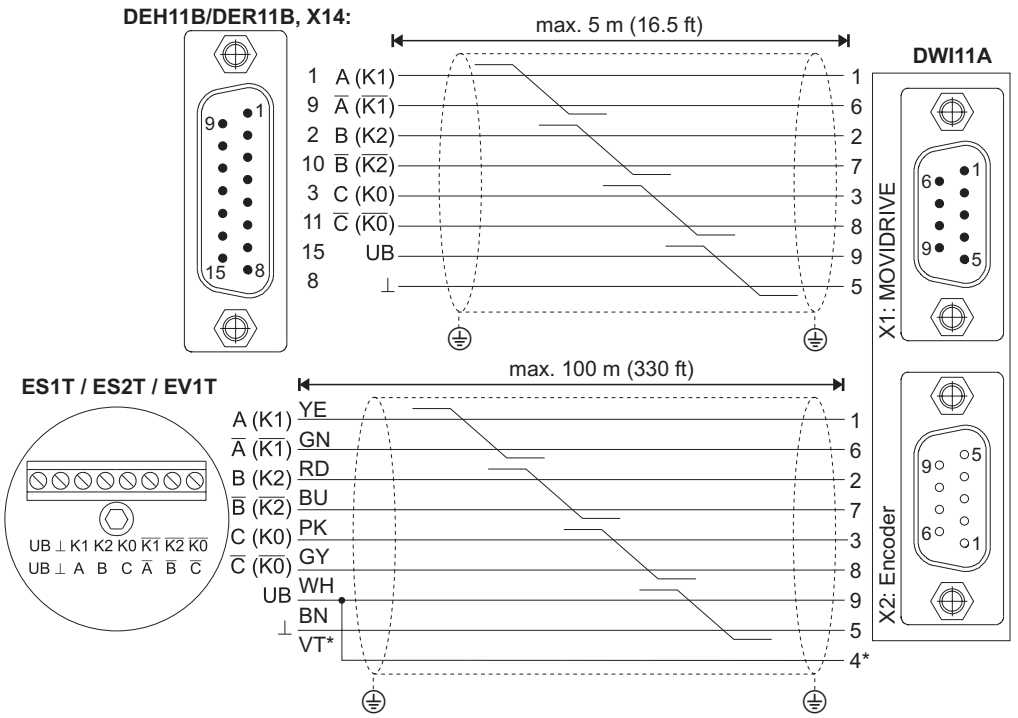
TTL sensors from SEW-EURODRIVE are available with DC 24 V and DC 5 V voltage supply.

DC 12...24 V voltage supply

Connect the TTL encoders with DC 12 ... 24 V voltage supply type EV1R in the same way as the high-resolution sin/cos encoders (→ Figure 37).

DC 5 V voltage supply

5 V TTL sensors with DC 5 V supply EV1T must be connected via the "5 V encoder power supply type DWI11A" option (part number 822 759 4). The sensor cable must be connected as well to correct the supply voltage of the encoder. Connect these encoders as follows:



06231BXX

Figure 42: Connecting the TTL sensor EV1T to MDX via DWI11A as an external encoder

* Connect the sensor cable (VT) on the encoder to UB, do not jumper on the DWI11A!

Part numbers of the pre-fabricated cables:

- Option HIPERFACE® encoder card DEH11B X14: → DWI11A X1:MOVIDRIVE®
  - For fixed routing: 818 164 0
- Encoder EV1T → DWI11A X2:Encoder
  - For fixed routing: 198 829 8
  - For cat track routing 198 828 X

4.18 Connection of incremental encoder simulation

Incremental encoder simulation

Connector X14 of the DEH11B or DER11B option can also be used as incremental encoder simulation output. For this purpose, you must jumper "switchover" (X14:7) with DGND (X14:8) and cut the connection between X14:15 and U_B. X14: then supplies incremental encoder signals with a signal level according to RS-422 (5 V TTL). The number of pulses is as follows:

- With DEH11B as on X15 motor encoder input
- With DER11B 1024 pulses/revolution

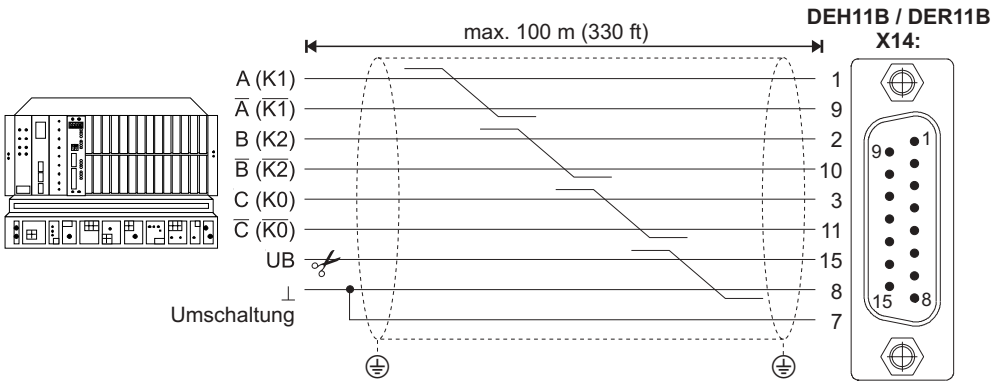


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Figure 43: Incremental encoder simulation connection to DEH11B or DER11B

Part number of the pre-fabricated cable:

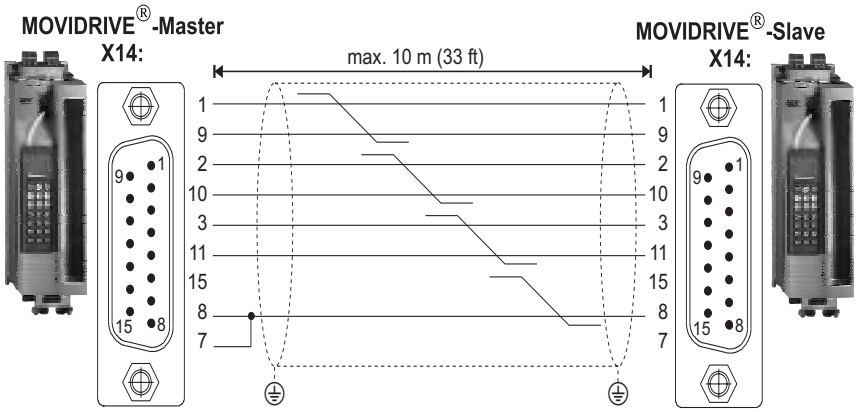
- Option type DEH/DER11B X14: →incremental encoder simulation
  - For fixed routing: 817 960 3

4.19 Master/slave connection

Master/slave connection

Connector X14 of the DEH11B or DER11B option can also be used for the "internal synchronous operation" application (master/slave connection of two MOVIDRIVE® units). For this purpose, you have to jumper "switchover" (X14:7) with DGND (X14:8) on the master side.

X14-X14 connection (= master/slave connection) of two MOVIDRIVE® units.



06660AXX

Figure 44: X14-X14 connection

Part number of the pre-fabricated cable:

- For fixed routing: 817 958 1

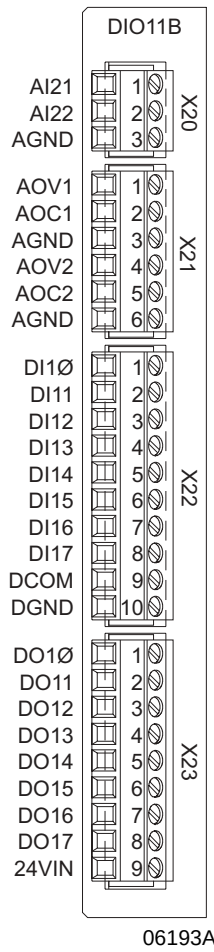
4.20 Connection and terminal description of the DIO11B option

Part number Input/output card type DIO11B: 824 308 5

The "input/output card type DIO11B" option is only possible in conjunction with MOVIDRIVE® MDX61B, not with MDX60B.

The DIO11B option must be plugged into the fieldbus slot. If the fieldbus slot is not available, you can plug the DIO11B input/output card in the expansion slot.

The **extended handle end** of the plug connectors (terminals X20, X21, X22, X23) must be used for **removing the plug connectors only** (not for plugging them!).

Front view of DIO11B	Terminal		Function
	**X20:1/2** **X20:3**	**AI21/22** **AGND**	Setpoint input n2, -10 V...0...10 V or 0...10 V (Differential input or input with AGND reference potential) Reference potential for analog signals (REF1, REF2, AI.., AO..)
	X21:1 **X21:4** **X21:2** **X21:5** **X21:3/6**	**AOV1** **AOV2** **AOC1** **AOC2** **AGND**	Analog voltage output V1, with factory setting "actual speed"! Analog voltage output V2, with factory setting "output current" Load capacity of the analog voltage outputs: I_{max} = 10 mA Analog current output C1, with factory setting "actual speed" Analog current output C2, with factory setting "output current" P642/645 "Operating mode AO1/2" sets whether the voltage outputs V1/2 (-10 V...0...10 V) or the current outputs C1/2 (0(4)...20 mA) are in effect. Selection options for the analog outputs → Parameter menu P640/643 Max. permitted cable length: 10 m (33 ft) Reference potential for analog signals (REF1, REF2, AI.., AO..)
	X22:1...8 **X22:9** **X22:10**	**DI1Ø...17** **DCOM** **DGND**	Binary inputs 1...8, with factory setting "no function" The binary inputs are electrically isolated by optocouplers. Selection options for the binary inputs → Parameter menu P61_ Reference potential for the binary inputs DI1Ø...17 Reference potential for binary signals – Without jumper X22:9-X22:10 (DCOM-DGND) → Isolated binary inputs – With jumper X22:9-X22:10 (DCOM-DGND) → Non-isolated binary inputs
	X23:1...8 **X23:9**	**DO1Ø...18** **24VIN**	Binary outputs 1...8, with factory setting "no function" Load capacity of the binary outputs: I_{max} = 50 mA (short-circuit proof) **Do not apply external voltage to the binary outputs!** Supply voltage +24 V for binary outputs D01Ø ... D017, non-isolated (reference potential DGND)

Voltage input 24 VIN

The 24VIN (X23:9) voltage input serves as +24 V supply voltage for the binary outputs DO1Ø ... DO17. Reference potential is DGND (X22:10). If the +24 V supply voltage is not connected, the binary outputs do not provide a level. The +24 V supply voltage may also be jumpered from the X10:8 connection of the basic unit if a load of 200 mA is not exceeded (current limitation in X10:8).

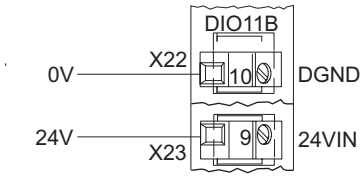


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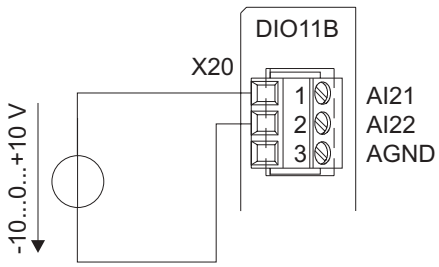
Figure 45: Voltage input 24VIN (X23:9) and reference potential DGND (X22:10)

Voltage input n2

The analog setpoint input n2 (AI21/22) can be used as a differential input or as input with AGND reference potential.

Differential input



Input with AGND reference potential

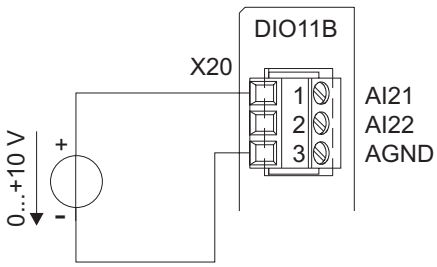


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Figure 46: Setpoint input n2

Current input n2

You must use an external load if the analog setpoint input n2 (AI21/22) should be used as a current input.

For example R_B = 500 Ω → 0...20 mA = 0...10 V

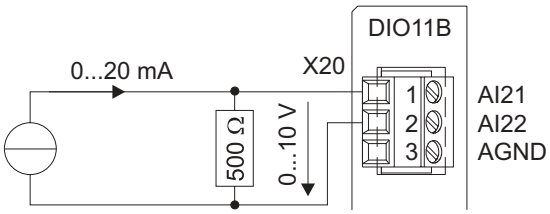

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Figure 47: Current input with external load

Voltage outputs AOV1 and AOV2

Analog voltage outputs AOV1 and AOV2 must be assigned as shown in the following diagram:

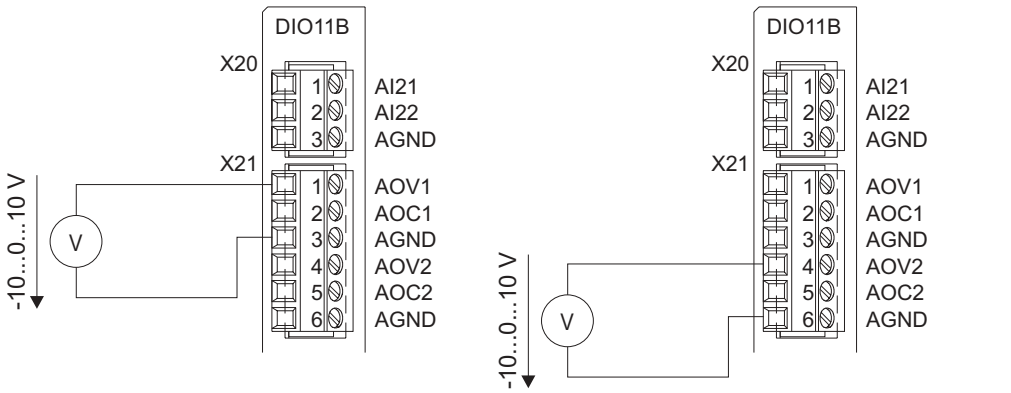

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Figure 48: Voltage outputs AOV1 and AOV2

Current outputs AOC1 and AOC2

Analog current outputs AOC1 and AOC2 must be assigned as shown in the following diagram:

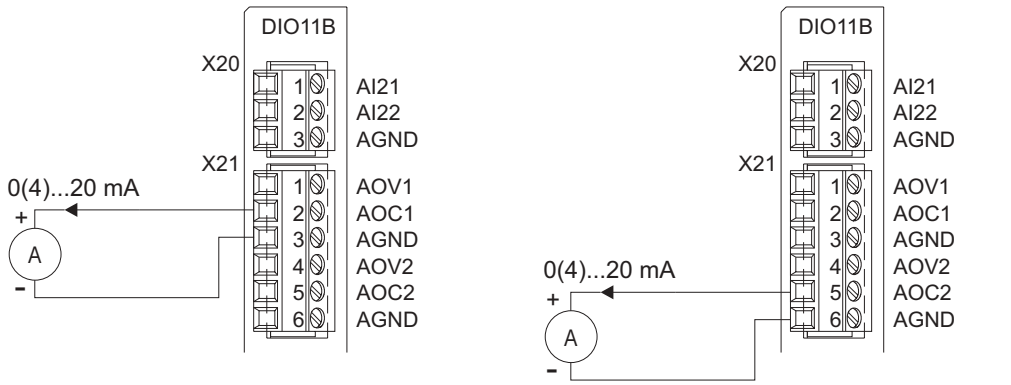

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Figure 49: Current outputs AOC1 and AOC2

5 Startup

5.1 General startup instructions

It is essential to comply with the safety notes during startup!

Prerequisite

Correct project planning of the drive is the prerequisite for successful startup. Refer to the MOVIDRIVE® MDX60/61B System Manual for detailed project planning notes and an explanation of the parameters.

VFC operating modes without speed control

MOVIDRIVE® MDX60/61B drive inverters are factory set to be taken into operation with the SEW motor which is adapted to the correct power level. The motor can be connected and the drive started immediately in accordance with the section "Starting the motor" (→ page 66).

Inverter/motor combinations

400/500 V units

The following tables indicate which inverter/motor combinations this applies to.

MOVIDRIVE® MDX60/61B in VFC mode	SEW motor
0005-5A3-4	DT80K4
0008-5A3-4	DT80N4
0011-5A3-4	DT90S4
0014-5A3-4	DT90L4
0015-5A3-4	DT90L4
0022-5A3-4	DV100M4
0030-5A3-4	DV100L4
0040-5A3-4	DV112M4
0055-5A3-4	DV132S4
0075-5A3-4	DV132M4
0110-5A3-4	DV160M4
0150-503-4	DV160L4
0220-503-4	DV180L4
0300-503-4	DV200L4
0370-503-4	DV225S4
0450-503-4	DV225M4
0550-503-4	DV250M4
0750-503-4	DV280S4
0900-503-4	DV280M4
1100-503-4	D315S4
1320-503-4	D315M4

230 V units

MOVIDRIVE® MDX60/61B in VFC mode	SEW motor
0015-2A3-4	DT90L4
0022-2A3-4	DV100M4
0037-2A3-4	DV112M4
0055-2A3-4	DV132S4
0075-2A3-4	DV132M4
0110-203-4	DV160M4
0150-203-4	DV160L4
0220-203-4	DV180L4
0300-203-4	DV200L4

The startup functions described in this section are used for setting the inverter so it is optimally adapted to the motor which is actually connected and to the given boundary conditions. It is essential to perform a startup as described in this section for the VFC operating modes with speed control, all CFC operating modes and SERVO operating modes.

Hoist applications

Do not use MOVIDRIVE® MDX60/61B drive inverters for any safety functions in conjunction with hoist applications.

Use monitoring systems or mechanical protection devices as safety features to avoid possible damage to property or injury to people.

5.2 Preliminary work and resources

- Check the installation.
- Take suitable measures to prevent the motor starting up inadvertently, for example by removing the electronics terminal block X13. Furthermore, additional safety precautions must be taken depending on the application to avoid injury to people and damage to machinery.
- For **startup with the DBG60B keypad**:

  Plug the DBG60B keypad into the Xterminal slot.
- For **startup with PC and MOVITOOLS® (version 4.0 or higher)**:

  SEW-EURODRIVE recommends to switch off MOVIDRIVE® and PC to avoid undefined states. Now plug the UWS21A option into the Xterminal slot and use an interface cable (RS-232) to connect it to the PC. Then switch on MOVIDRIVE® and PC. Install and start MOVITOOLS on your PC.
- Switch on the power system and, if necessary, the 24 V supply.
- Perform the correct preliminary parameter setting (e.g. factory setting).
- Check the set terminal assignment (→ P60_ / P61_).

Startup **automatically changes a group of parameter values**. The parameter description P700 "Operating modes" explains which parameters are affected by this step. Refer to the MOVIDRIVE® MDX60/61B System Manual, section "Parameters" for the **parameter description**.

5.3 Startup using the DBG60B keypad

General information

Startup with the DBG60B keypad is **possible in VFC operating modes only**. Startup of CFC and SERVO operating modes is only possible using the MOVITOOLS® operating software.

Required data

The following data are required for successful startup:

- Motor type (SEW motor or non-SEW motor)
- Motor data
  - Rated voltage and rated frequency.
  - In addition, with a non-SEW motor: Rated current, rated power, power factor cosφ and rated speed.
- Rated power supply voltage

The following information is also required for the startup of the speed controller:

- Incremental encoder type
- Encoder type and resolution of the incremental encoder:

SEW encoder type	Startup parameters	
	Encoder type	Encoder resolution
AS1H, ES1H, AV1H	HIPERFACE®	1024
ES1S, ES2S, EV1S	SINE ENCODER	1024
ES1R, ES2R, EV1R ES1T[1], ES2T[1], EV1T[1]	INCREM. ENCOD. TTL	1024

1) 5 V TTL sensors ES1T, ES2T and EV1T must be connected via the DWI11A option (→ section Installation).

- Motor data
  - SEW motor: Brake yes or no and flywheel fan (Z fan) yes or no
  - Non-SEW motor: Mass moment of inertia [10^{-4}kgm^2] of the motor, brake and fan
- Stiffness of the closed-loop control system (factory setting = 1; applies to most applications)

  If the drive is tending to oscillate → setting < 1

  If the transient recovery time is too long → setting > 1

  Recommended setting range: 0.90 ... 1 ... 1.10
- Mass moment of inertia [10^{-4}kgm^2] of the load (gear unit + driven machine) extrapolated for the motor shaft.
- Time for the shortest required ramp.

- Activate encoder monitoring (P504 = "ON") after completing the startup. The function and voltage supply of the encoder are then monitored.

Caution: Encoder monitoring is not a safety function!

Starting mode and language selection

DBG60B keypad: Keys for language selection.

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Figure 50: Keys for language selection

1. Language selection
2. Up arrow, moves up to the next menu item
3. OK, confirms the entry
4. Down arrow, moves down to the next menu item

The following text appears on the display when the keypad is switched on for the first time or after activating starting mode:

SEW
EURODRIVE

The language selection symbol then appears with an arrow on the left pointing downward.

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Proceed as follows to select the language:

- Press the "language selection" button to display a list with available languages.
- Use the "up/down arrow" keys to select the desired language.
- Confirm the selected language by pressing the "OK" key. The display text then appears in the selected language.

Functions for startup

DBG60B keypad: Keys for startup.

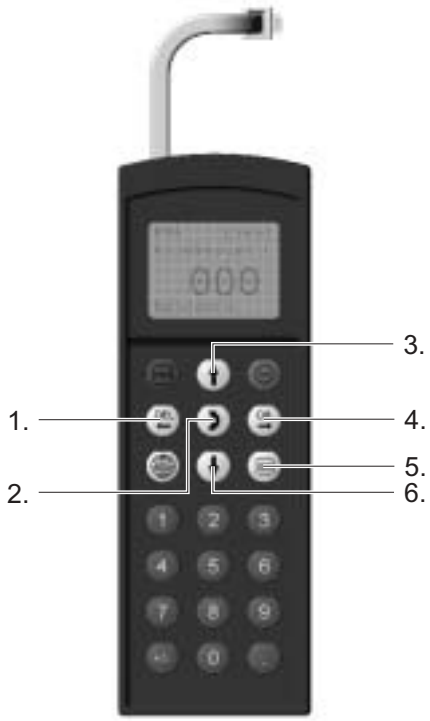

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Figure 51: Keys for startup

1. Cancel or abort startup
2. Change the menu, display mode ↔ edit mode
3. Up arrow, moves up to the next menu item
4. OK, confirms the entry
5. Activates the context menu
6. Down arrow, moves down to the next menu item

Setting parameters

Observe the following steps for setting parameters:

- The blinking cursor under the parameter number indicates that the keypad is in display mode.
- Press the [↔] key to change to edit mode; the blinking cursor disappears.
- Press the [↑] or [↓] key to select or set the correct parameter value.
- Press the [OK] key to confirm the selection or entry.
- Press the [↔] key to return to display mode; the blinking cursor appears again.
- Press the [↑] key to select the next parameter.

Startup procedure

1. "0" signal at terminal X13:1 (DIØØ "/CONTROL.INHIBIT"), e.g. by disconnecting the electronics terminal block X13.

   0.00rpm
   0.000Amp
   CONTR. INHIBIT

2. Activate the context menu by pressing the ☰ key.

   PARAMETER MODE
   VARIABLE MODE
   BASIC VIEW

3. Press the ↓ key and scroll down to the "STARTUP PARAMET." menu item.

   MANUAL MODE
   STARTUP PARAMET.
   COPY TO DBG
   COPY TO MDX

4. Commence startup by pressing the OK key. The first parameter appears. The blinking cursor under the parameter number indicates that the keypad is in display mode.
   - Change to edit mode by pressing the ↻ key; the blinking cursor disappears.
   - Press the ↑ or ↓ key and select "PARAMETERSET 1" or "PARAMETERSET 2".
   - Confirm the selection by pressing the OK key.
   - Return to display mode by pressing the ↻ key; the blinking cursor appears again.
   - Press the ↑ key to select the next parameter.

   STARTUP PARAMET.
   PREPARE FOR STARTUP

   C00*STARTUP

   PARAMETER SET 1
   PARAMETER SET 2

5. Select the desired operating mode. Press the ↑ key to select the next parameter.

   C01*OPER. MODE 1

   VFC1
   VFC1&GROUP

6. Select the motor type. If a 2 or 4-pole SEW motor is connected, select the correct motor from the list. If a non-SEW motor or an SEW motor with more than four poles is connected, select "NON-SEW MOTOR" from the list.
   Press the ↑ key to select the next parameter.

   C02*MOTOR TYPE 1
   DT71D2
   DT71D4
   DT80K2

   C02*MOTOR TYPE 1

   NON-SEW MOT.
   DT63K4/DR63S4

7. Enter the rated motor voltage for the selected connection type according to the value specified on the nameplate.

   Example: Nameplate 230Δ/400⅄ 50 Hz
   ⅄ connection → enter 400 V.
   Δ connection, transition point at 50 Hz → enter 230 V.
   Δ connection, transition point at 87 Hz → also enter 230 V, however after startup first set parameter P302 "MAXIMUM SPEED 1" to the value for 87 Hz and then start the drive.

   Example: Nameplate 400Δ/690⅄ 50 Hz
   Only Δ connection possible → enter 400 V.
   ⅄ connection is not possible.

   Press the ↑ key to select the next parameter.

   C03* V
   MOT. RATED VOLT 1
   +400.000

8. Enter the rated frequency specified on the motor nameplate.
   Example: 230Δ/400⅄ 50 Hz
   In ⅄ and Δ connection, enter 50 Hz.

   Press the ↑ key to select the next parameter.

   C04* Hz
   MOT. RATED FREQ. 1
   +50.000

WITH SEW MOTORS

9. The motor values are stored for SEW two and four-pole motors and need not be entered.

WITH NON-SEW MOTORS

9. Enter the following data from the motor nameplate:
   - C10* rated motor current, note the connection type (⅄ or Δ).
   - C11* rated motor power
   - C12* power factor cos φ
   - C13* rated motor speed

10. Enter the rated power supply voltage (C05* for SEW motor, C14* for non-SEW motor).

```
C05*                    V
MAINS RAT. VOLT. 1
                +400.000
```

11. If no TF/TH is connected to X10:1 and X10:2 → set "NO RESPONSE". Set the required fault response if a TF/TH is connected.

```
835*   RESP. TF-SIG.

NO RESPONSE
DISPLAY FAULT
```

12. Commence the startup data calculation by selecting "YES". The process lasts a few seconds.

```
C06*CALCULATION

NO
YES
```

WITH SEW MOTORS

13. The calculation is performed. After complete calculation, the next menu item appears automatically.

```
C06*SAVE

NO
YES
```

WITH NON-SEW MOTORS

13. The calculation for non-SEW motors requires a calibration procedure:
   - When prompted, apply a "1" signal to terminal X13:1 (DIØØ "/CONTROL.INHIBIT").
   - Apply a "0" signal to terminal X13:1 again after the calibration is complete.
   - After complete calculation, the next menu item appears automatically.

14. Set "SAVE" to "YES". The data (motor parameters) are copied into the non-volatile memory of MOVIDRIVE®.

```
COPYING DATA
...
```

15. Startup is now complete. Press the [DEL] key to return to the context menu.

```
MANUAL MODE
STARTUP PARAMET.
COPY TO DBG
COPY TO MDX
```

16. Press the [↓] key to scroll down to the "EXIT" menu command.

```
EXIT
```

17. Confirm by pressing the [OK] key. The basic view appears.

```
0.00rpm
0.000Amp
CONTR. INHIBIT
```

Startup of speed controller

Startup is performed without the speed controller first (→ steps 1 through 17).

Important: Select the VFC-n-CONTROL operating mode.

C01*OPER. MODE 1
VFC1&FLYSTART
VFC1-n-CONTROL
VFC-n-CTRL.GRP

Startup procedure

1. Commence speed controller startup by selecting "YES".

C09*STARTUPn-CTRL.

NO
YES

2. The selected operating mode is displayed. If set correctly, scroll to the next menu item.

C00*STARTUP
PARAMETER SET 2
VFC-n-CONTROL

3. Select the correct encoder type.

C15*ENCODER TYPE
INCREM. ENCOD. TTL
SINE ENCODER
INCREM. ENCOD. HTL

4. Set the correct encoder resolution.

C16*ENC. RESOLUT.
512 inc
1024 inc
2048 inc

WITH SEW MOTORS

5. Enter whether the motor has a brake.

C17*BRAKE

WITHOUT
WITH

6. Set the stiffness of the closed-loop control system.
   If the drive is tending to oscillate → setting < 1
   If the transient recovery time is too long → setting > 1
   Recommended setting range: 0.90 ... 1 ... 1.10

C18*
STIFFNESS
+1.000

7. Enter whether the motor has a flywheel fan (Z fan).

C19*Z FAN

WITHOUT
WITH

WITH NON-SEW MOTORS

5. Enter the moment of inertia of the motor.

D00*
J0 OF THE MOTOR
+4.600

6. Set the stiffness of the closed-loop control system.
   If the drive is tending to oscillate → setting < 1
   If the transient recovery time is too long → setting > 1
   Recommended setting range: 0.90 ... 1 ... 1.10

C18*
STIFFNESS
+1.000

7. Enter the moment of inertia of brake and fan.

D00*
J BRAKE+FAN
+1.000

8. Enter the mass moment of inertia of the load (gear unit + driven machine) extrapolated for the motor shaft.

C20*
LOAD INERTIA
+0.200

9. Enter the time for the shortest ramp you want.

C21* s
SHORTEST RAMP
+0.100

10. Commence the calculation of startup data by selecting "YES". The process lasts a few seconds.

C06*CALCULATION
NO
YES

11. The calculation is performed. After complete calculation, the next menu item appears automatically.

C06*SAVE
NO
YES

12. Set "SAVE" to "YES". The data (motor parameters) are copied into the non-volatile memory of MOVIDRIVE®.

COPYING
DATA...

13. Startup is now complete. Press the DEL key to return to the context menu.

MANUAL MODE
STARTUP PARAMET.
COPY TO DBG
COPY TO MDX

14. Press the ↓ key to scroll down to the "EXIT" menu command.

EXIT

15. Confirm by pressing the OK key. The basic view appears.

0.00rpm
0.000Amp
CONTR. INHIBIT

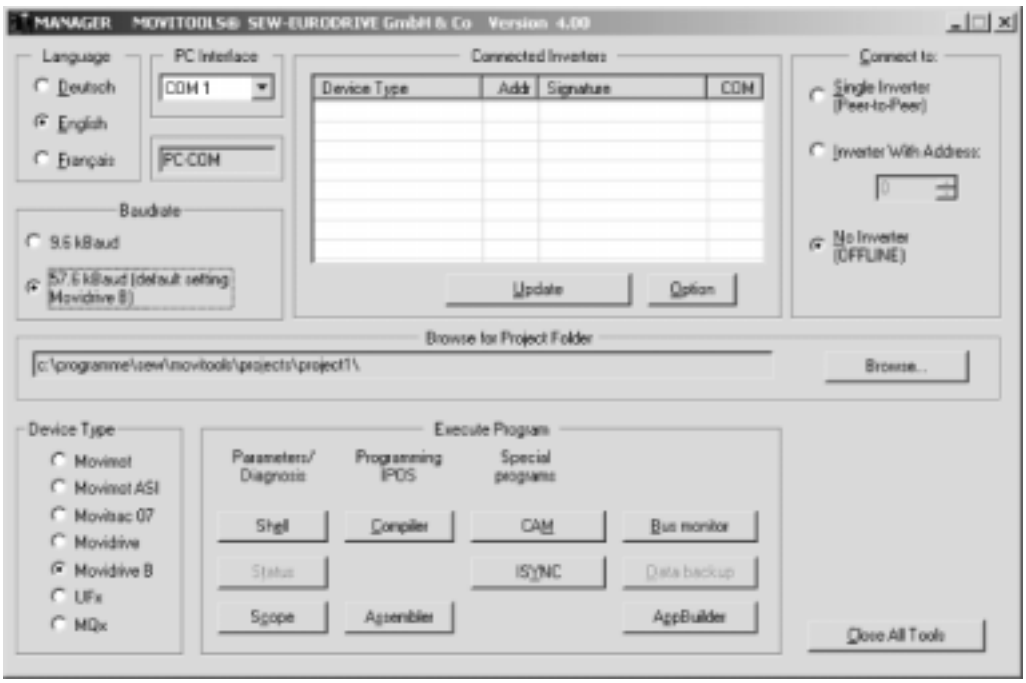
- After complete startup, copy the parameter set from MOVIDRIVE® to the DBG60B keypad (P807 "MDX → DBG"). That way, the DBG60B can be used to transfer the parameter set to other MOVIDRIVE® units (P 806 "DBG → MDX").
- Enter parameter settings that differ from the factory setting in the parameter list (→ page 69).
- In the case of non-SEW motors, set the correct brake application time (P732 / P735).
- For starting the motor, refer to the "Starting the motor" section (" page 66).
- With Δ connection and transition point at 87 Hz → Set parameter P302/312 "Maximum speed 1/2" to the value for 87 Hz.
- Activate encoder monitoring for TTL sensors, sin/cos and HIPERFACE® encoders (P504="ON"). **Encoder monitoring is not a safety function.**

5.4 Startup with PC and MOVITOOLS®

MOVITOOLS® software version 4.0 or higher is required for startup with a PC.

General information

- Terminal X13:1 (DIØØ "/CONTROL.INHIBIT") must receive a "0" signal!
- Start MOVITOOLS®.
- Select the language in the "Language" selection field.
- In the "PC-COM" selection field, select the PC port (e.g. COM 1) to which the inverter is connected.
- In the "Device type" field, select the "Movidrive B" radio button.
- In the "Baud rate" field, select "57.6 kBaud".
- Press the <Update> button to display the connected inverter.



10322AEN

Figure 52: MOVITOOLS startup window®

Commencing startup

- In the "Execute Program" selection field, press the <Shell> button under "Parameters/Diagnosis". The Shell program starts.
- In the Shell program, select the [Startup] / [Startup...] menu command. MOVITOOLS® opens the startup menu. Follow the instructions of the startup wizard. For questions on startup, refer to the MOVITOOLS® online help.

5.5 Starting the motor

Analog setpoint specification

The following table shows the signals that must be present on terminals X11:2 (AI1) and X13:1 to X13:4 (DIØØ to DIØ3) when the "UNIPOL/FIX.SETPT" setpoint is selected (P100) to operate the drive with an analog setpoint entry.

Function	X11:2 (AI11) Analog input n1	X13:1 (DIØØ) /Controller inhibit	X13:2 (DIØ1) CW/STOP	X13:3 (DIØ2) CCW/STOP	X13:4 (DIØ3) Enable/rapid stop
Controller inhibit	X	"0"	X	X	X
Rapid stop	X	"1"	X	X	"0"
Enable and stop	X	"1"	"0"	"0"	"1"
CW at 50 % n_{max}	5 V	"1"	"1"	"0"	"1"
Clockwise at n_{max}	10 V	"1"	"1"	"0"	"1"
CCW at 50 % n_{max}	5 V	"1"	"0"	"1"	"1"
CCW at n_{max}	10 V	"1"	"0"	"1"	"1"

The following travel cycle shows by way of example how the motor is started with the wiring of terminals X13:1 to X13:4 and analog setpoints. Binary output X10:3 (DBØØ "/Brake") is used for switching brake contactor K12.

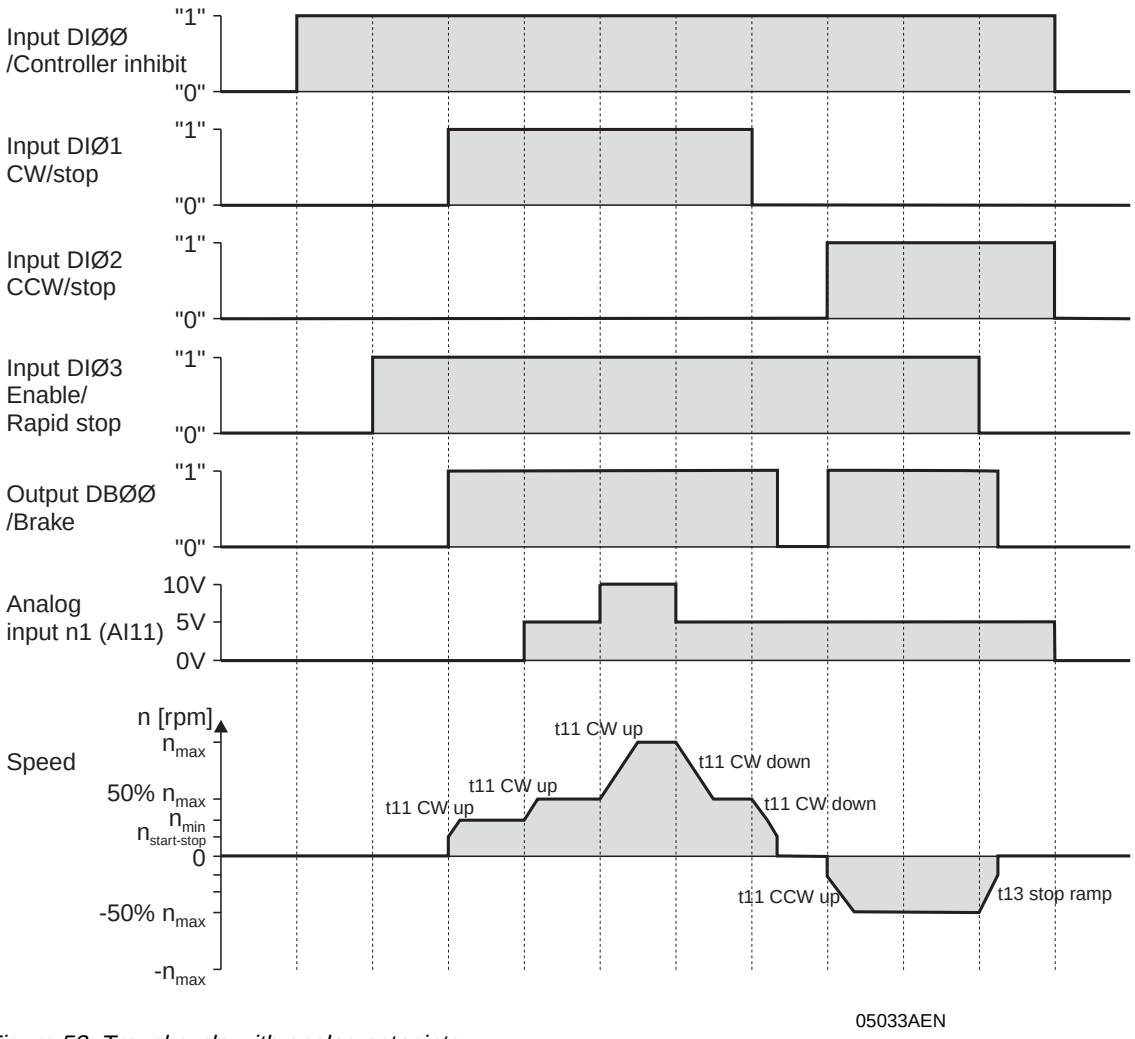


Figure 53: Travel cycle with analog setpoints

The motor is not energized in the event of controller inhibit (DIØØ = "0"). A motor without a brake then coasts to a halt.

Fixed setpoints The following table shows the signals that must be present on terminals X13:1 to X13:6 (DIØØ to DIØ5) when the "UNIPOL/FIX.SETPT" setpoint is selected (P100) to operate the drive with the fixed setpoints.

Function	X13:1 (DIØØ) /Controller inhibit	X13:2 (DIØ1) CW/STOP	X13:3 (DIØ2) CCW/STOP	X13:4 (DIØ3) Enable/rapid stop	X13:5 (DIØ4) n11/n21	X13:6 (DIØ5) n12/n22
Controller inhibit	"0"	X	X	X	X	X
Rapid stop	"1"	X	X	"0"	X	X
Enable and stop	"1"	"0"	"0"	"1"	X	X
CW at n11	"1"	"1"	"0"	"1"	"1"	"0"
CW at n12	"1"	"1"	"0"	"1"	"0"	"1"
CW at n13	"1"	"1"	"0"	"1"	"1"	"1"
CCW at n11	"1"	"0"	"1"	"1"	"1"	"0"

Following travel cycle shows an example of how the drive is started with the wiring of terminals X13:1 to X13:6 and internal fixed setpoints. Binary output X10:3 (DBØØ "/Brake") is used for switching brake contactor K12.

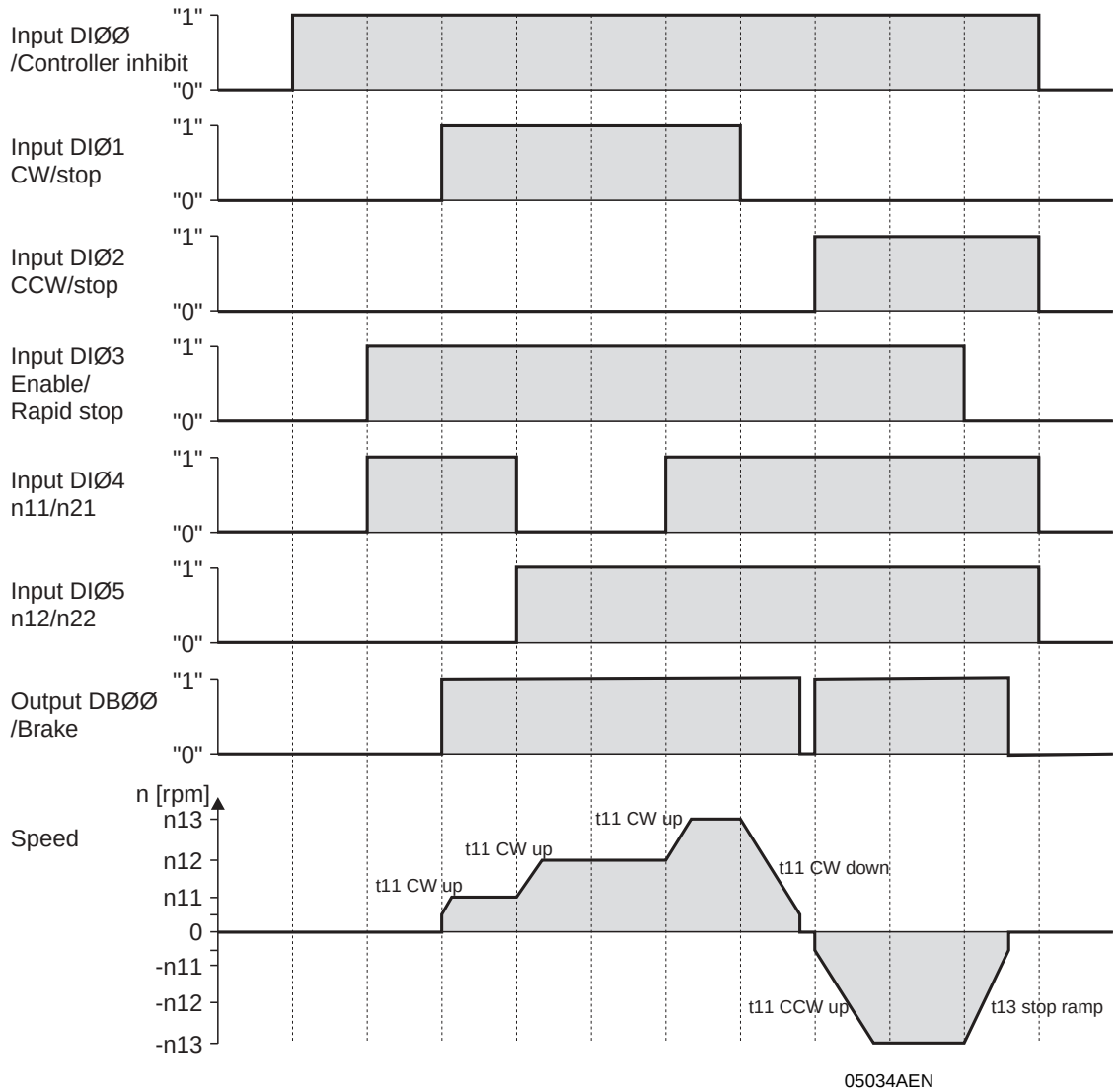


Figure 54: Travel cycle with internal fixed setpoints

STOP

The motor is not energized in the event of controller inhibit (DIØØ = "0"). A motor without a brake then coasts to a halt.

Startup in the "VFC & flying start" operating mode

In "VFC & flying start" operating mode, parameter *P320 Automatic adjustment* is deactivated. It is important that the stator resistance (*P322 IxR compensation 1)* is set correctly to ensure that the flying start function is performed properly.

Startup of an SEW motor via DBG60B and MOVITOOLS®:

- The value of the stator resistance (*P322 IxR compensation 1)* is set for an SEW motor at operating temperature (winding temperature 80 °C). For flying start with a cold motor, you have to reduce the stator resistance *(P322 IxR compensation 1)* by 0.34 % per Kelvin.

Startup of a non-SEW motor via DBG60B and MOVITOOLS®:

Measure the stator resistance *(P322 IxR compensation 1)* at startup. Proceed as follows to do so:

1. Start up the motor in "VFC" operation mode.
2. Enable the motor at rest.
3. **Note** or **remember** the value of *P322 IxR compensation 1* (stator resistance).
4. Set the "VFC & flying start " operating mode.
5. Set *P320 "Automatic adjustment 1* to "Off".
6. Enter the *value noted* from step 3 in *P322 IxR compensation 1* (stator resistance).

5.6 Complete parameter list

The parameters of the short menu are marked by a "/" (= display on the DBG60B keypad).

Par.	Name	Value range
DISPLAY VALUES		
00_	**Process values**	
000	Speed	-6100...0...6100 1/min
001/	User display	[Text]
002	Frequency	0... 500 Hz
003	Actual position	$0...2^{31}$-1 inc
004	Output current	0...250 % I_N
005	Active current	-250...0...250 % I_N
006/	Motor utilization 1	0...200 %
007	Motor utilization 2	0...200 %
008	DC link voltage	0...1000 V
009	Output current	A
01_	**Status displays**	
010	Inverter status	
011	Operational status	
012	Fault status	
013	Active parameter set	1/2
014	Heat sink temperature	-20...0...100 °C
015	Mains ON operating time	0...25000 h
016	Operating time (enabled)	0...25000 h
017	Electrical energy	kWh
02_	**Analog setpoints**	
020	Analog input AI1	-10...0...10 V
021	Analog input AI2	-10...0...10 V
022	External current limit	0...100 %
03_	**Binary inputs basic unit**	
030	Binary input DIØØ	/CONTROL.INHIBIT
031	Binary input DIØ1	not in the DBG60B
032	Binary input DIØ2	
033	Binary input DIØ3	
034	Binary input DIØ4	
035	Binary input DIØ5	
036	Binary input DIØ6	
037	Binary input DIØ7	
039/	Status binary inputs DIØØ...DIØ7	
04_	**Binary inputs option**	
040	Binary input DI1Ø	not in the DBG60B
041	Binary input DI11	
042	Binary input DI12	
043	Binary input DI13	
044	Binary input DI14	
045	Binary input DI15	
046	Binary input DI16	
047	Binary input DI17	
048/	Status binary inputs DI1Ø...DI17	

Par.	Name	Value range
05_	**Binary outputs basic unit**	
050	Binary output DBØØ	/BRAKE
051	Binary output DOØ1	not in the DBG60B
052	Binary output DOØ2	
053	Binary output DOØ3	
054	Binary output DOØ4	
055	Binary output DOØ5	
059/	Status binary outputs DBØØ, DOØ1...DOØ5	
06_	**Binary outputs option**	
060	Binary output DO1Ø	not in the DBG60B
061	Binary output DO11	
062	Binary output DO12	
063	Binary output DO13	
064	Binary output DO14	
065	Binary output DO15	
066	Binary output DO16	
067	Binary output DO17	
068/	Status binary outputs DO1Ø...DO17	
07_	**Unit data**	
070	Unit type	
071	Rated output current	
072	Option 1 encoder slot	
073	Option 2 fieldbus slot	
074	Option 3 expansion slot	
076	Firmware basic unit	
077	DBG firmware	only in the DBG60B
078	Technology function	
079	Unit design	0 = Standard 1 = Application
08_	**Fault memory**	
080/	Fault t-0	
081	Fault t-1	
082	Fault t-2	
083	Fault t-3	
084	Fault t-4	
09_	**Bus diagnosis**	
090	PD configuration	
091	Fieldbus type	
092	Fieldbus baud rate	
093	Fieldbus address	
094	PO1 setpoint	
095	PO2 setpoint	
096	PO3 setpoint	
097	PI1 actual value	
098	PI2 actual value	
099	PI3 actual value	

Par.	Name Variable par. Parameter set 1	Setting range Factory setting	After startup	Par.	Name Parameter set 2	Setting range Factory setting	After startup
1__	**SETPOINTS / RAMP GENERATORS**						
10_	**Setpoint selection**						
100/	Setpoint source	**UNIPOL/FIX.SETPT**					
101	Control signal source	**TERMINALS**					
102	Frequency scaling	10...**10000**...65000 kHz					
11_	**Analog input AI1**						
110	AI1 scaling	-10...-0.1 / 0.1...**1**...10					
111	AI1 offset	-500...**0**...500 mV					
112	AI1 operation mode	**Ref. N-MAX**					
113	AI1 voltage offset	-10...**0**...10 V					
114	AI1 speed offset	-6000...**0**...6000 1/min					
115	Filter setpoint	0...**5**...100 ms 0 = Filter off					
12_	**Analog inputs (optional)**						
120	AI2 operating mode	**NO FUNCTION**					
13_	**Speed ramps 1**			**14_**	**Speed ramps 2**		
130/	Ramp t11 UP CW	0...**2**...2000 s		140	Ramp t21 UP CW	0...**2**...2000 s	
131/	Ramp t11 DOWN CW	0...**2**...2000 s		141	Ramp t21 DOWN CW	0...**2**...2000 s	
132/	Ramp t11 UP CCW	0...**2**...2000 s		142	Ramp t21 UP CCW	0...**2**...2000 s	
133/	Ramp t11 DOWN CCW	0...**2**...2000 s		143	Ramp t21 DOWN CCW	0...**2**...2000 s	
134/	Ramp t12 UP=DOWN	0...**2**...2000 s		144	Ramp t22 UP=DOWN	0...**2**...2000 s	
135	S pattern t12	**0**...3		145	S pattern t22	**0**...3	
136/	Stop ramp t13	0...**2**...20 s		146	Stop ramp t23	0...**2**...20 s	
137/	Emergency ramp t14	0...**2**...20 s		147	Emergency ramp t24	0...**2**...20 s	
138	Ramp limit VFC	No **Yes**					
139	Ramp monitoring 1	**No** Yes		149	Ramp monitoring 2	**No** Yes	
15_	**Motor potentiometer (parameter sets 1 and 2)**						
150	Ramp t3 UP	0.2...**20**...50 s					
151	Ramp t3 DOWN	0.2...**20**...50 s					
152	Save last setpoint	**OFF** ON					
16_	**Fixed setpoints 1**			**17_**	**Fixed setpoints 2**		
160/	Internal setpoint n11	-6000...0...**150**...6000 1/min		170	Internal setpoint n21	-6000...0...**150**...6000 1/min	
161/	Internal setpoint n12	-6000...0...**750**...6000 1/min		171	Internal setpoint n22	-6000...0...**750**...6000 1/min	
162/	Internal setpoint n13	-6000...0...**1500**...6000 1/min		172	Internal setpoint n23	-6000...0...**1500**...6000 1/min	

Par.	Name Variable par. Parameter set 1	Setting range Factory setting	After startup	Par.	Name Parameter set 2	Setting range Factory setting	After startup
2__	**CONTROLLER PARAMETERS**						
20_	**Speed control (only parameter set 1)**						
200	P-gain speed controller	0.1...**2**...32					
201	Time constant n-control.	0...**10**...300 ms					
202	Gain accel. feedforward	**0**...32					
203	Filter accel. feedforward	**0**...100 ms					
204	Filter speed actual value	**0**...32 ms					
205	Load feedforward CFC	**0**...150 %					
206	Sample time n-control.	**1 ms** 0.5 ms					
207	Load feedforward VFC	**0**...150 %					
21_	**Hold control**						
210	P gain hold control	0.1...**2**...32					
22_	**Synchr. oper. control (only parameter set 1)**						
220	P-gain (DRS)	1...**10**...200					
221	Master gear ratio factor	**1**...3 999 999 999					
222	Slave gear ratio factor	**1**...3 999 999 999					
223	Mode selection	**Mode 1** Mode 2 Mode 3 Mode 4 Mode 5 Mode 6 Mode 7 Mode 8					
224	Slave counter	-99 999 999...-10 / **10**...99 999 999 inc					
225	Offset 1	-32 767...-10 / **10**...32 767 inc					
226	Offset 2	-32 767...-10 / **10**...32 767 inc					
227	Offset 3	-32 767...-10 / **10**...32 767 inc					
228	Feedforward filter (DRS)	**0**...100 ms		Only with MOVITOOLS®. Not visible on the DBG60B keypad.			
23_	**Synchr. oper. w. sync. encoder**						
230	Synchronous encoder	**OFF** EQUAL-RANKING CHAIN					
231	Factor slave encoder	**1**...1000					
232	Factor slave sync. encoder	**1**...1000					
233	Synchronous encoder resolution	128 / 256 / 512 / **1024** / 2048					
24_	**Synchr. oper. w. catch up**						
240	Synchronization speed	-6000...0...**1500**... 6000 1/min					
241	Synchronization ramp	0...**2**...50 s					

Par.	Name Variable par. Parameter set 1	Setting range Factory setting	After startup	Par.	Name Parameter set 2	Setting range Factory setting	After startup
3__	**MOTOR PARAMETERS**						
30_	**Limits 1**			**31_**	**Limits 2**		
300/	Start/stop speed 1	0...**60**...150 1/min		310	Start/stop speed 2	0...**60**...150 1/min	
301/	Minimum speed 1	0...**60**...6100 1/min		311	Minimum speed 2	0...**60**...6100 1/min	
302/	Maximum speed 1	0...**1500**...6100 1/min		312	Maximum speed 2	0...**1500**...6100 1/min	
303/	Current limit 1	0...**150**...200 % I_N		313	Current limit 2	0...**150**...200 % I_N	
304	Torque limit	**0**...200 %					
32_	**Motor compensat. 1 (asynchr.)**			**33_**	**Motor compensat. 2 (asynchr.)**		
320/	Automatic adjustment 1	Off **On**		330	Automatic adjustment 2	Off **On**	
321	Boost 1	**0**...100 %		331	Boost 2	**0**...100 %	
322	IxR compensation 1	**0**...100 %		332	IxR compensation 2	**0**...100 %	
323	Premagnetizing time 1	0...**0.1**...2 s		333	Premagnetizing time 2	0...**0.1**...2 s	
324	Slip compensation 1	**0**...500 1/min		334	Slip compensation 2	**0**...500 1/min	
34_	**Motor protection**						
340	Motor protection 1	**Off** ON (asynchronous) ON (synchronous)		342	Motor protection 2	**Off** ON (asynchronous)	
341	Cooling type 1	**Fan cooled** Forced cooling		343	Cooling type 2	**Fan cooled** Forced cooling	
344	Motor protection interval	0.1...**4**...20 s					
35_	**Direction of rotation of the motor**						
350	Change direction of rotation 1	**Off** On		351	Change direction of rotation 2	**Off** On	
360	Startup	YES / **NO**		Only available in DBG60B, not in MOVITOOLS®/SHELL!			
4__	**REFERENCE SIGNALS**						
40_	**Speed reference signal**						
400	Speed reference value	0...**1500**...6000 1/min					
401	Hysteresis	0...**100**...500 1/min					
402	Delay time	0...**1**...9 s					
403	Signal = '1' if:	**n < n_{ref}** n > n_{ref}					
41_	**Speed window signal**						
410	Window center	0...**1500**...6000 1/min					
411	Range width	**0**...6000 1/min					
412	Delay time	0...**1**...9 s					
413	Signal = '1' if:	**INSIDE** OUTSIDE					
42_	**Speed setp./act. val. comp.**						
420	Hysteresis	1...**100**...300 1/min					
421	Delay time	0...**1**...9 s					
422	Signal = '1' if:	**n <> n_{set}** n = n_{set}					
43_	**Current reference signal**						
430	Current reference value	0...**100**...200 % I_N					
431	Hysteresis	0...**5**...30 % I_N					
432	Delay time	0...**1**...9 s					
433	Signal = '1' if:	**I < I_{ref}** I > I_{ref}					
44_	**Imax signal**						
440	Hysteresis	0...**5**...50 % I_N					
441	Delay time	0...**1**...9 s					
442	Signal = '1' if:	I = I_{max} / **I < I_{max}**					

Par.	Name Variable par. Parameter set 1	Setting range Factory setting	After startup	Par.	Name Parameter set 2	Setting range Factory setting	After startup
5__	**MONITORING FUNCTIONS**						
50_	**Speed monitoring**						
500	Speed monitoring 1	OFF MOTOR MODE REGENERAT. MODE **MOT. & REGEN.MODE**		502	Speed monitoring 2	OFF MOTOR MODE REGENERAT. MODE **MOT. & REGEN.MODE**	
501	Delay time 1	0...**1**...10 s		503	Delay time 2	0...**1**...10 s	
504	Encoder monitoring motor	**No** Yes					
505	External encoder monitoring	**No** Yes					
51_	**Synchr. operation monitoring**						
510	Positioning tol. slave	10...**25**...32 768 inc					
511	Prewarning lag error	**50**...99 999 999 inc					
512	Setpoint deviation limit	100...**4000**... 99 999 999 inc					
513	Delay lag error signal	0...**1**...99 s					
514	Counter LED display	10...**100**...32 768 inc					
515	Delay in-position signal	5...**10**...2000 ms					
52_	**Mains OFF monitoring**						
520	Mains OFF response time	**0**...5 s					
521	Mains OFF response	**CONTR. INHIBIT** EMERGENCY STOP					
522	Phase failure monitoring	**Yes** No					
53_	**Thermal protection motor**						
530	Sensor type 1 (in preparation)	**No sensor** TF/TH		531	Sensor type 2 (in preparation)	**No sensor** TF/TH	

Par.	Name Variable par. Parameter set 1	Setting range Factory setting	After startup	Par.	Name Parameter set 2	Setting range Factory setting	After startup
6__	**TERMINAL ASSIGNMENT**						
60_	**Binary inputs basic unit**						
-	Binary input DIØØ	With fixed assignment: **/CONTROL.INHIBIT**					
600	Binary input DIØ1	**CW/STOP**		**The following functions can be programmed:** NO FUNCTION • ENABLE/RAP. STOP • CW/STOP • CCW/STOP•n11/n21 •n12/n22 • FIX SETPT SW.OV. • PAR. SWITCHOVER • RAMP SWITCHOVER • MOTOR POT UP • MOTOR POT DOWN • /EXT. FAULT • FAULT RESET • /HOLD CONTROL • /LIM. SWITCH CW • /LIM. SWITCH CCW • IPOS INPUT • REFERENCE CAM • REF.TRAVEL START • SLAVE FREE RUNN. • SETPOINT HOLD • MAINS ON • DRS SET ZERO • DRS SLAVE START • DRS TEACH IN • DRS MAST. STOPPED • RESERVIERT • RESERVED. • RESERVED • RESERVED. • /CONTROL.INHIBIT • RESERVED • MQX ENCODER IN		
601	Binary input DIØ2	**CCW/STOP**					
602	Binary input DIØ3	**ENABLE/RAP.STOP**					
603	Binary input DIØ4	**n11/n21**					
604	Binary input DIØ5	**n12/n22**					
605	Binary input DIØ6	**NO FUNCTION**					
606	Binary input DIØ7	**NO FUNCTION**					
61_	**Binary inputs option**						
610	Binary input DI1Ø	**NO FUNCTION**					
611	Binary input DI11	**NO FUNCTION**					
612	Binary input DI12	**NO FUNCTION**					
613	Binary input DI13	**NO FUNCTION**					
614	Binary input DI14	**NO FUNCTION**					
615	Binary input DI15	**NO FUNCTION**					
616	Binary input DI16	**NO FUNCTION**					
617	Binary input DI17	**NO FUNCTION**					
62_	**Binary outputs basic unit**						
-	Binary output DBØØ	With fixed assignment: **/BRAKE**					
620	Binary output DOØ1	**READY**		**The following signals can be programmed:** NO FUNCTION • /FAULT • READY • OUTP. STAGE ON • ROT. FIELD ON • BRAKE RELEASED • BRAKE APPLIED • MOTOR STANDSTILL • PARAMETER SET • SPEED REFERENCE • SPEED WINDOW • SP/ACT.VAL.COMP. • CURR. REFERENCE • Imax SIGNAL • /MOTOR UTILIZ. 1 • /MOTOR UTILIZ. 2 • /DRS PREWARN. • /DRS LAG ERROR • DRS SLAVE IN POS • IPOS IN POSITION • IPOS REFERENCE • IPOS OUTPUT • /IPOS FAULT		
621	Binary output DOØ2	**/FAULT**					
622	Binary output DOØ3	**IPOS OUTPUT**					
623	Binary output DOØ4	**IPOS OUTPUT**					
624	Binary output DOØ5	**IPOS OUTPUT**					
63_	**Binary outputs option**						
630	Binary output DO1Ø	**NO FUNCTION**					
631	Binary output DO11	**NO FUNCTION**					
632	Binary output DO12	**NO FUNCTION**					
633	Binary output DO13	**NO FUNCTION**					
634	Binary output DO14	**NO FUNCTION**					
635	Binary output DO15	**NO FUNCTION**					
636	Binary output DO16	**NO FUNCTION**					
637	Binary output DO17	**NO FUNCTION**					
64_	**Analog outputs optional**						
640	Analog output AO1	**ACTUAL SPEED**		**The following functions can be programmed:** NO FUNCTION • RAMP INPUT • SPEED SETPOINT • ACTUAL SPEED • ACTUAL FREQUENCY • OUTPUT CURRENT • ACTIVE CURRENT • UNIT UTILIZATION • IPOS OUTPUT • RELATIVE TORQUE • IPOS OUTPUT 2		
641	Scaling AO1	-10...0...**1**...10					
642	Operating mode AO1	OFF / **-10...+10 V** / 0...20 mA / 4...20 mA					
643	Analog output AO2	**OUTP.CURRENT**					
644	Scaling AO2	-10...0...**1**...10					
645	Operating mode AO2	OFF / **-10...+10 V** / 0...20 mA / 4...20 mA					

Par.	Name Variable par. Parameter set 1	Setting range Factory setting	After startup	Par.	Name Parameter set 2	Setting range Factory setting	After startup
7__	**CONTROL FUNCTIONS**						
70_	**Operating modes**						
700	Operating mode 1	**VFC 1** VFC 1 & GROUP VFC 1 & HOIST VFC 1 & DC BRAK. VFC 1 & FLYSTART VFC-n-CONTROL VFC-n-CTRL&GRP. VFC-n-CTRL.&HOIST VFC-n-CTRL.&SYNC VFC-n-CTRL& IPOS RESERVED CFC CFC & M-CONTROL CFC & IPOS CFC&SYNC. RESERVED SERVO SERVO & M-CTRL. SERVO&IPOS SERVO&SYNC. RESERVED		701	Operating mode 2	**VFC 2** VFC 2 & GROUP VFC 2 & HOIST VFC 2 & DC BRAK. VFC 2 & FLYSTART	
71_	**Current at standstill**						
710	Standstill current 1	**0**...50 % I_{Mot}		711	Standstill current 2	**0**...50 % I_{Mot}	
72_	**Setpoint stop function**						
720	Setpoint stop function 1	**Off** On		723	Setpoint stop function 2	**Off** On	
721	Stop setpoint 1	0...**30**...500 1/min		724	Stop setpoint 2	0...**30**...500 1/min	
722	Start offset 1	0...**30**...500 1/min		725	Start offset 2	0...**30**...500 1/min	
73_	**Brake function**						
730	Brake function 1	Off **On**		733	Brake function 2	Off **On**	
731	Brake release time 1	**0**...2 s		734	Brake release time 2	**0**...2 s	
732	Brake application time 1	0...**0.2**...2 s		735	Brake application time 2	0...**0.2**...2 s	
74_	**Speed skip**						
740	Skip window center 1	0...**1500**...6000 1/min		742	Skip window center 2	0...**1500**...6000 1/min	
741	Skip width 1	**0**...300 1/min		743	Skip width 2	**0**...300 1/min	
75_	**Master-Slave function**						
750	Slave setpoint	**MASTER-SLAVE OFF** SPEED (RS-485) SPEED (SBus) SPEED 485+SBus) TORQUE (RS-485) TORQUE (SBus) TORQUE(485+SBus) LOAD SHARE (RS-485) LOAD SHARE (SBus) LOAD S.(485+SBus)					
751	Scaling Slave setpoint	-10...0...**1**...10					
76_	**Manual operation**						
760	Locking run/stop keys	**No** Yes					

Par.	Name Variable par. Parameter set 1	Setting range Factory setting	After startup	Par.	Name Parameter set 2	Setting range Factory setting	After startup
8__	**UNIT FUNCTIONS**						
80_	**Setup**						
800	User menu	Only in the DBG60B					
801	Language	Only in DBG60B					
802/	Factory setting	No Yes Delivery condition					
803/	Parameter lock	**Off** On					
804	Reset statistic data	**NO** FAULT MEMORY KWH METER OPERATING HOURS					
806	Copy DBG60B → MDX	Only in DBG60B					
807	Copy MDX → DBG60B	Only in DBG60B					
81_	**Serial communication**						
810	RS485 address	**0**...99					
811	RS485 group address	**100**...199					
812	RS485 timeout delay	**0**...650 s					
819	Fieldbus timeout delay	0...**0.5**...650 s					
82_	**Brake operation**						
820/	4-quadrant operation 1	Off **On**		821	4-quadrant operation 2	Off **On**	
83_	**Fault responses**						
830	Response EXT. FAULT	**EMERG.STOP/FAULT**		**The following fault responses can be programmed:** NO RESPONSE • DISPLAY FAULT • IMM. STOP/FAULT • EMERG.STOP/FAULT • RAPID STOP/FAULT • IMM. STOP/WARN. •EMERG.STOP/WARNG •RAPID STOP/WARNG For P831 "FIELDBUS TIMEOUT response", the fault response "PODATA = 0/WARN." is available in addition.		
831	Response FIELDBUS TIMEOUT	**RAPID STOP/WARNG**					
832	Response MOTOR OVERLOAD	**EMERG.STOP/FAULT**					
833	Response RS485 TIMEOUT	**RAPID STOP/WARNG**					
834	Response DRS LAG ERROR	**EMERG.STOP/FAULT**					
835/	Response TF sensor SIGNAL	**NO RESPONSE**					
836	Response SBus TIMEOUT 1	**EMERG.STOP/FAULT**					
837	Response SBus TIMEOUT 2	**EMERG.STOP/FAULT**					
838	SW limit switch	**EMERG.STOP/FAULT**					
84_	**Reset response**						
840/	Manual reset	**No** Yes					
841	Auto reset	**Off** On					
842	Restart time	1...**3**...30 s					
85_	**Scaling speed actual value**						
850	Scaling factor numerator	**1**...65535		Can only be set using MOVITOOLS®			
851	Scaling factor denominator	**1**...65535					
852	User dimension	**1/min**					

Par.	Name Variable par. Parameter set 1	Setting range Factory setting	After startup	Par.	Name Parameter set 2	Setting range Factory setting	After startup
86_	**Modulation**						
860	PWM frequency 1 VFC	**4 kHz** 8 kHz 12 kHz 16 kHz		861	PWM frequency 2 VFC	**4 kHz** 8 kHz 12 kHz 16 kHz	
862	PWM fix 1	**Off** On		863	PWM fix 2	**Off** On	
864	PWM frequency CFC	**4 kHz** 8 kHz 16 kHz					
87_	**Process data description**						
870	Setpoint description PO1	**CTRL. WORD 1**		**The following PO assignment can be set:** NO FUNCTION • SPEED • CURRENT • POSITION LO • POSITION HI • MAX: SPEED • MAX: CURRENT • SLIP • RAMP • CTRL. WORD 1 • CTRL. WORD 2 • SPEED [%] • IPOS PO-DATA			
871	Setpoint description PO2	**SPEED**					
872	Setpoint description PO3	**NO FUNCTION**					
873	Actual value description PI1	**STATUS WORD 1**		**The following PI assignment can be set:** NO FUNCTION • SPEED • OUTPUT CURRENT • ACTIVE CURR. • POSITION LO • POSITION HI • STATUS WORD 1 • STATUS WORD 2 • SPEED [%] • IPOS PI-DATA • RESERVED • STATUS WORD 3			
874	Actual value description PI2	**SPEED**					
875	Actual value description PI3	**OUTP.CURRENT**					
876	PO data enable	Off **On**					
877	DeviceNet PD configuration	1...24 PD / Param. + 1...24 PD					
88_	**Serial communication CAN 1**						
880	CAN protocol 1	**SBus MOVILINK** CANopen					
881	SBus address 1	**0**...63					
882	SBus group address 1	**0**...63					
883	SBus timeout delay 1	**0**...650 s					
884	SBus baud rate 1	125 kBaud 250 kBaud **500 kBaud** 1000 kBaud					
885	SBus synchronization ID 1	**0**...2047					
886	CANopen address 1						
887	SBus 1/2 Synchronization ext. Control	**Off** On					
888	SBus 1/2 Synchronization time	**5**...10 ms					
89_	**Serial communication CAN 2**						
890	CAN protocol 2	**SBus MOVILINK** CANopen					
891	SBus address 2	**0**...63					
892	SBus group address 2	**0**...63					
893	SBus timeout delay 2	**0**...650 s					
894	SBus baud rate 2	125 kBaud 250 kBaud **500 kBaud** 1000 kBaud					
895	SBus synchronization ID 2	**0**...2047					
896	CANopen address 2						

Par.	Name Variable par. Parameter set 1	Setting range Factory setting	After startup	Par.	Name Parameter set 2	Setting range Factory setting	After startup
9__	**IPOS PARAMETERS**						
90_	**IPOS Reference travel**						
900	Reference offset	-2^{31}...**0**...2^{31}-1 Inc					
901	Reference speed 1	0...**200**...6000 1/min					
902	Reference speed 2	0...**50**...6000 1/min					
903	Reference travel type	**0**...7					
904	Reference travel to zero pulse	**Yes** No					
905	HIPERFACE® Offset X15	-7FFFFFFF$_h$...**0**... 7FFFFFFF$_h$ inc					
910	Gain X controller	0...**500**...32000					
911	Positioning ramp 1	10...**1000**...20000 s					
912	Positioning ramp 2	10...**1000**...20000 s					
917	Ramp mode	**0 = MODE 1** 1 = MODE 2					
913	Travel speed CW	0...**1500**...6000 1/min					
914	Travel speed CCW	0...**1500**...6000 1/min					
915	Speed feedforward	-199.99...0...**100** ...199.99 %					
916	Ramp type	**LINEAR** SINE SQUARED BUSRAMP JERK LIMITED CAM CONTROL I-SYNCHR.OPERAT.					
92_	**IPOS Monitoring**						
920	SW limit switch CW	-2^{31}...**0**...2^{31}-1 inc					
921	SW limit switch CCW	-2^{31}...**0**...2^{31}-1 inc					
922	Position window	0...**50**...32767 inc					
923	Lag error window	0...**5000**...2^{31}-1 inc					
93_	**IPOS Special functions**						
930	Override	ON / **OFF**					
931	CTRL word Task 1	START / **STOP** / HALT		Only available in DBG60B, not in MOVITOOLS®/SHELL!			
932	IPOS CTRL WORD Task 2	START / **STOP**		Only available in DBG60B, not in MOVITOOLS®/SHELL! Display parameter, cannot be edited using DBG60B.			
933	Jerk time	**5**...2000 s					
938	IPOS speed task 1	**0**...9					
939	IPOS speed task 2	**0**...9					
94_	**IPOS Variables/encoder**						
940	IPOS variables edit	ON / **OFF**		This parameter is only available on the DBG60B keypad, not in MOVITOOLS®!			
941	Source actual position	**Motor encoder** Ext. Encoder Absolute encoder					
942	Encoder factor numerator	**1**...32767					
943	Encoder factor denominator	**1**...32767					
944	Encoder scaling ext. Encoder	**x1**/x2/x4/x8/x16/x32/x64		Only with MOVITOOLS®. Not visible on the DBG60B keypad.			
945	Encoder type	**TTL** SIN/COS HTL HIPERFACE					
946	Counting direction of synchronous encoder	**NORMAL** INVERTED					
947	HIPERFACE® Offset (X14)	-7FFFFFFF$_{hex}$...**0**... 7FFFFFFF$_{hex}$ inc					

Par.	Name Variable par. Parameter set 1	Setting range Factory setting	After startup	Par.	Name Parameter set 2	Setting range Factory setting	After startup
95_	**DIP**						
950	Encoder type	**NO ENCODER**					
951	Counting direction	**NORMAL** INVERTED					
952	Switching frequency	**1**...200 %					
953	Position offset	-(2^{31}-1)...**0**...2^{31}-1					
954	Zero offset	-(2^{31}-1)...**0**...2^{31}-1					
955	Encoder scaling	**x1**/x2/x4/x8/x16/x32/x64					
96_	**IPOS Modulo function**						
960	Modulo function	**OFF** SHORT CW CCW					
961	Modulo numerator	**0**...2^{31}					
962	Modulo denominator	**0**...2^{31}					
963	Modulo encoder resolution	0...**4096**...20000					

6 Operation and Service

6.1 Operating condition indication

7-segment display

The 7-segment display shows the operating condition of MOVIDRIVE® in hexadecimal notation and, in the event of a fault, a fault or warning code.

Display	Meaning
0	Inverter not ready
1	Controller inhibit active
2	No enable
3	Current at standstill
4	VFC mode
5	n-control
6	M-control
7	Hold control
8	Factory setting
9	Limit switch reached
A	Technology option
b	unassigned
C	IPOS$^{plus®}$ reference travel
d	Flying start
E	unassigned
F	Fault display (flashing) → page 87
H	Manual operation
t	Timeout active → page 86
amb	"Safe Stop" active
• (flashing dot)	IPOS$^{plus®}$ program is running
flashing digit	STOP via DBG 60B

The display U = "Safe stop" active is not safety-related and may not be used as a safety function!

DBG60B keypad

Basic displays:

0.00rpm 0.000Amp CONTR. INHIBIT	Display when X13:1 (DIØØ "/CONTROLLER INHIBIT") = "0".
0.00rpm 0.000Amp NO ENABLE	Display when X13:1(DIØØ "/CONTROLLER INHIBIT") = "1" and inverter is disabled ("ENABLE/RAPID STOP" = "0").
950.00rpm 0.990Amp ENABLE (VFC)	Display when inverter enabled.
NOTE 6: VALUE TOO LARGE	Information message
(X)=Quit FAULT 9 STARTUP PARAMET.	Fault indication

6.2 Information messages

Information messages on the DBG60B (ca. 2 s in duration) or in MOVITOOLS®/SHELL (message that can be acknowledged):

No.	Text DBG60B/SHELL	Description
1	ILLEGAL INDEX	Index addressed via interface is not available.
2	NOT IMPLEMENTED	• Attempt to execute a non-implemented function. • An incorrect communication service has been selected. • Manual mode selected via impermissible interface (e.g. fieldbus).
3	READ ONLY VALUE	Attempt to modify a read only value.
4	PARAM. INHIBITED	Parameter lock P803 = "ON", Parameter cannot be altered.
5	SETUP ACTIVE	Attempt to alter parameters during active factory setting.
6	VALUE TOO LARGE	Attempt to enter a value which is too large.
7	VALUE TOO SMALL	Attempt to enter a value which is too small.
8	REQ. PCB MISSING	The option card required for the selected function is missing.
-		
10	ONLY VIA ST1	Manual mode must be completed using X13:ST11/ST12 (RS-485).
11	TERMINAL ONLY	Manual mode must be completed using TERMINAL (DBG11A or USS21A).
12	NO ACCESS	Access to selected parameter refused.
13	NO CTRLR. INHIBIT	Set terminal DIØØ "/Controller inhibit" = "0" for the selected function.
14	INVALID VALUE	Attempt to enter an invalid value.
--		
16	PARAM. NOT SAVED	EEPROM buffer overrun, e.g. due to cyclical write accesses. Parameter is saved in EEPROM and is not protected against loss following POWER OFF.

6.3 Functions of the DBG60B keypad

Key assignment

DBG60B keypad: Functions of the keys.

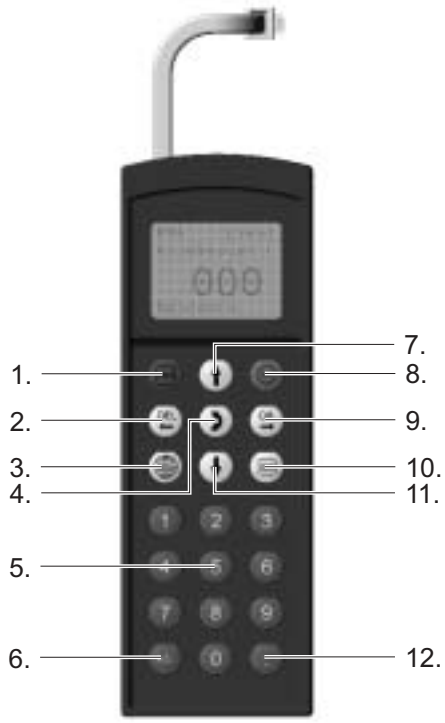


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Figure 55: Functions of the keys

1. Stop
2. Delete previous entry
3. Language selection
4. Change menu
5. Numbers 0 to 9
6. Sign reversal
7. Up arrow, moves up to the next menu item
8. Start
9. OK, confirms the entry
10. Activates the context menu
11. Down arrow, moves down to the next menu item
12. Decimal point

Copy function of DBG60B

The DBG60B keypad can be used for copying complete parameter sets from one MOVIDRIVE® unit to other MOVIDRIVE® units. Proceed as follows to do so:

- Select "COPY TO DBG" from the context menu and confirm by pressing the OK key.
- After the copying process has completed, install the keypad on the other inverter.
- Select "COPY TO MDX" from the context menu and confirm by pressing the OK key.

Parameter mode

Proceed as follows to set the parameters in parameter mode:

1. Activate the context menu by pressing the [≡] key. The first menu item is "PARAMETER MODE".

PARAMETER MODE
VARIABLE MODE
BASIC VIEW

2. Start PARAMETER MODE by pressing the [OK] key. The first display parameter P000 "SPEED" appears. Press the [↑] or [↓] key to select the main parameter groups 0 to 9.

P 000 rpm
SPEED
+0.0
CONTR. INHIBIT

3. Press the [↑] or [↓] key to select the desired parameter main group. The blinking cursor is positioned under the number of the main parameter group.

P 1.. SETPOINTS/
RAMP GENERATORS

CONTR. INHIBIT

4. In the desired parameter main group, press the [OK] key to select the parameter subgroup. The blinking cursor moves one position to the right.

P 1.. SETPOINTS/
RAMP GENERATORS

CONTR. INHIBIT

5. Press the [↑] or [↓] key to select the desired parameter subgroup. The blinking cursor is positioned under the number of the parameter subgroup.

\ 13. SPEED
RAMPS 1

CONTR. INHIBIT

6. In the desired parameter subgroup, press the [OK] key to select the parameter. The blinking cursor moves one position to the right.

\ 13. SPEED
RAMPS 1

CONTR. INHIBIT

7. Press the [↑] or [↓] key to select the desired parameter. The blinking cursor is positioned under the third digit of the parameter number.

\ 132 s
T11 UP CCW
+0.13
CONTR. INHIBIT

8. Activate the setting mode for the selected parameter by pressing the [OK] key. The cursor is positioned under the parameter value.

\ 132 s
T11 UP CCW
+0.13_
CONTR. INHIBIT

9. Press the [↑] or [↓] key to select the desired parameter.

\ 132 s
T11 UP CCW
+0.20_
CONTR. INHIBIT

10. Confirm the setting by pressing the [OK] key. Exit the setting mode by pressing the [↩] key. The blinking cursor is positioned under the third digit of the parameter number again.

\ 132 s
T11 UP CCW
+0.20
CONTR. INHIBIT

11. To select another parameter, press the [↑] or [↓] key, or return to the parameter subgroup menu by pressing the [DEL] key.

\ 13. SPEED
RAMPS 1

CONTR. INHIBIT

12. To select another parameter subgroup, press the [↑] or [↓] key, or return to the menu with the main parameter groups by pressing the [DEL] key.

P 1.. SETPOINTS/
RAMP GENERATORS

CONTR. INHIBIT

13. Return to the context menu by pressing the [≡] key.

PARAMETER MODE
VARIABLE MODE
BASIC VIEW

User menu or detailed parameter menu

The DBG60B keypad features a detailed parameter menu with all parameters, and a user menu with the most frequently used parameters. You can choose from the context menu whether you want to use the detailed parameter menu or the user menu. The parameters of the user menu are indicated on the display by a '/' preceding the parameter number.

- Select "PARAMETER MODE" from the context menu and confirm by pressing OK.
- The detailed parameter menu appears.
- Select "USER MENU" from the context menu and confirm by pressing OK.
- The user menu with the most frequently used parameters appears.

IPOS$^{plus®}$

MOVITOOLS® version 4.0 or higher is required for programming IPOS$^{plus®}$. The DBG60B keypad can be used to display or modify IPOS$^{plus®}$ Parameters (P9__).

The IPOS$^{plus®}$ program is also stored in the DBG60B keypad when it is saved and is consequently also transferred when the parameter set is copied to another MOVIDRIVE® unit.

Parameter P931 can be used for starting and stopping the IPOS$^{plus®}$ program from the DBG60B keypad.

6.4 Memory card

The pluggable memory card is installed in the basic unit. The data stored on the memory card are always current and do not have to be copied with typing errors. If a unit has to be replaced, the system/machine can be operated again quickly without the need of a PC and data backup simply by replugging the memory card. Any number of option cards can be installed or power sections replaced without parameters being lost.

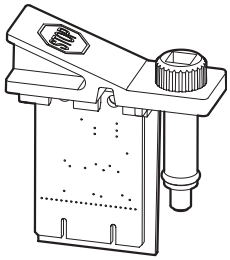

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Figure 56: MDX60B/61B memory card

- The memory card may only be installed in another inverter if that inverter is identical with the inverter where the card was originally installed.
- If this is not the case, the error message "79 HW configuration" (hardware configuration) appears. The error can be reset by selecting "Starting mode" (P802, new formatting) from the context menu.

6.5 Fault information

Fault memory

The fault memory (P080) stores the last five fault messages (faults t-0 to t-4). The fault message of longest standing is deleted whenever more than five fault messages have occurred. The following information is stored when a malfunction occurs:

Fault which occurred • Status of the binary inputs/outputs • Operational status of the inverter • Inverter status • Heat sink temperature • Speed • Output current • Active current • Unit utilization • DC link circuit voltage • ON hours • Enable hours • Parameter set • Motor utilization.

Switch-off responses

There are three switch-off responses depending on the fault; the inverter is inhibited when in fault status:

Immediate switch-off

The unit can no longer brake the drive; the output stage goes to high resistance in the event of a fault and the brake is applied immediately (DBØØ "/Brake" = "0").

Rapid stop

The drive is braked with the stop ramp t13/t23. Once the stop speed is reached, the brake is applied (DBØØ "/Brake" = "0"). The output stage goes to high-resistance after the brake reaction time has elapsed (P732 / P735).

Emergency stop

The drive is braked with the emergency ramp t14/t24. Once the stop speed is reached, the brake is applied (DBØØ "/Brake" = "0"). The output stage goes to high-resistance after the brake reaction time has elapsed (P732 / P735).

Reset

A fault message can be acknowledged by:

- Switching the supply system off and on again

  Recommendation: Observe a minimum switch-off time of 10 s for the supply system contactor K11.
- Reset via input terminals, that means via an appropriately assigned binary input (DIØ1 to DIØ7 with the basic unit, DI1Ø to DI17 with the DIO11B option).
- Manual reset in SHELL (P840 = "YES" or [Parameter] / [Manual reset]).
- Manual reset using the DBG60B
- Auto reset performs up to five unit resets with an adjustable restart time. Not to be used with drives where an automatic restart represents a risk of injury to people or damage to equipment.

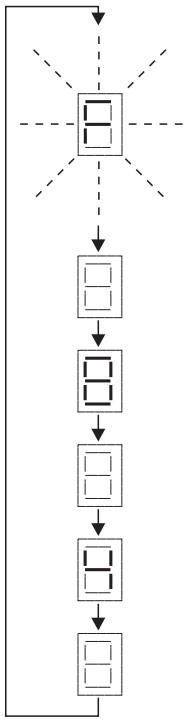
Timeout active

If the inverter is controlled via a communication interface (fieldbus, RS-485 or SBus) and the power was switched off and back on again or a fault reset was performed, then the enable remains ineffective until the inverter once again receives valid data via the interface which is monitored with a timeout.

6.6 Fault messages and list of faults

Fault message on 7-segment display

The fault or warning code is displayed in BCD format. The following display sequence is adhered to (e.g. fault code 84):



Flashes, ca. 1 s

Display off, ca. 0.2 s

Tens, ca. 1 s

Display off, ca. 0.2 s

Ones, ca. 1 s

Display off, ca. 0.2 s

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The display switches over to the operating display following a reset or if the fault or warning code resumes the value '0.'

List of faults

A dot in the "P" column indicates that the response is programmable (P83_ Fault response). The factory set fault response is listed in the "Response" column.

Fault code	Designation	Response	P	Possible cause	Action
00	No fault	-			
01	Overcurrent	Immediate switch-off		• Short circuit on output • Motor too large • Defective output stage	• Rectify the short circuit • Connect a smaller motor • Contact SEW Service for advice if the output stage is defective
03	Ground fault in the motor cable	Immediate switch-off		Ground fault • in the motor cable • in the inverter • in the motor	• Eliminate ground fault • Consult SEW Service
04	Brake chopper	Immediate switch-off		• Regenerative power excessive • Braking resistor circuit interrupted • Short circuit in braking resistor circuit • Excessively high braking resistance • Brake chopper defective	• Extend deceleration ramps • Check feeder cable to braking resistor • Check technical data of braking resistor • Replace MOVIDRIVE® if the brake chopper is defective
06	Mains phase failure	Immediate switch-off		Phase failure	Check supply system lead
07	DC link overvoltage	Immediate switch-off		DC link voltage too high	• Extend deceleration ramps • Check connecting harness for braking resistor • Check technical data of braking resistor

Fault code	Designation	Response	P	Possible cause	Action
08	n-monitoring	Immediate switch-off		• Speed controller or current controller (in VFC operating mode without encoder) operating at setting limit due to mechanical overload or phase failure in the power system or motor. • Encoder not connected correctly or incorrect direction of rotation. • n_{max} is exceeded during torque control.	• Reduce load • Increase deceleration time setting (P501 or P503). • Check encoder connection, swap over A/A and B/B pairs if necessary • Check encoder voltage supply • Check current limitation • Extend ramps if appropriate • Check motor cable and motor • Check supply system phases
09	Startup	Immediate switch-off		Inverter startup not yet performed for selected operating mode.	Perform startup for appropriate operating mode.
10	IPOS-ILLOP	Emergency stop		• Incorrect command detected during running of IPOS$^{plus®}$ program. • Incorrect conditions during command execution.	• Check program memory content and correct if necessary. • Load correct program into program memory. • Check program sequence (→ IPOS$^{plus®}$ manual)
11	Overtemperature	Emergency stop		Thermal overload of inverter.	Reduce load and/or ensure adequate cooling.
12	Resolver 14 bits	Emergency stop		**Only with DER11B option:** 14-bit resolver evaluation is active and the actual speed is ≥ 6000 1/min.	Set P302 "Maximum speed 1" to max. 6000 1/min.
13	Control signal source	Immediate switch-off		Control signal source not defined or defined incorrectly.	Set correct control signal source (P101).
14	Encoder	Immediate switch-off		• Encoder cable or shield not connected correctly • Short circuit/open circuit in encoder cable • Encoder defective	Check encoder cable and shield for correct connection, short circuit and open circuit.
15	24 V internal	Immediate switch-off		No internal 24 V supply voltage.	Check the mains connection. Contact SEW Service if this fault reoccurs.
17-24	System fault	Immediate switch-off		Inverter electronics disrupted, possibly due to effect of EMC.	Check ground connections and shieldings and correct, if necessary. If this error occurs again, contact SEW service for support.
25	EEPROM	Rapid stop		Fault when accessing EEPROM of the memory card	• Call up default setting, perform reset and set parameters again. • Contact SEW service if this fault reoccurs. • Replace memory card.
26	External terminal	Emergency stop	•	Read in external fault signal via programmable input.	Eliminate specific cause of fault; reprogram terminal if necessary.
27	Limit switches missing	Emergency stop		• Open circuit/both limit switches missing. • Limit switches are swapped over in relation to direction of rotation of motor	• Check wiring of limit switches. • Swap over limit switch connections. • Reprogram terminals
28	Fieldbus timeout	Rapid stop	•	No master/slave communication took place within the configured response monitoring time.	• Check master communication routine • Extend fieldbus timeout time (P819) or switch off monitoring
29	Limit switch reached	Emergency stop		A limit switch was reached in IPOS$^{plus®}$ operating mode.	• Check travel range. • Correct user program.
30	Emergency stop timeout	Immediate switch-off		• Drive overloaded • Emergency stop ramp too short	• Check project planning • Extend emergency stop ramp
31	TF sensor	No response	•	• Motor too hot, TF sensor has tripped • TF sensor of motor not connected or not connected properly • Connection of MOVIDRIVE® and TF on motor interrupted • No jumper between X10:1 and X10:2.	• Let motor cool off and reset fault • Check connections/link between MOVIDRIVE® and TF. • If no TF is connected: Jumper X10:1 to X10:2. • Set P835 to "NO RESPONSE"
32	IPOS index overrun	Emergency stop		Basic programming rules violated causing stack overflow in system.	Check IPOS$^{plus®}$ user program and correct if necessary (→ IPOS$^{plus®}$ manual).
33	Setpoint source	Immediate switch-off		Setpoint source not defined or defined incorrectly	Set correct setpoint source (P100).
34	Ramps timeout	Immediate switch-off		Time of downward ramps exceeded, e.g. due to overload.	• Extend the downwards ramps • Eliminate overload
35	Operating mode	Immediate switch-off		Operating mode not defined or defined incorrectly	Use P700 or P701 to set correct operating mode

Fault code	Designation	Response	P	Possible cause	Action
36	No option	Immediate switch-off		• Type of option card not allowed. • Setpoint source, control signal source or operating mode not permitted for this option card. • Incorrect encoder type set for DIP11A.	• Use correct option card. • Set correct setpoint source (P100). • Set correct control signal source (P101). • Set correct operating mode (P700 or P701). • Set the correct encoder type.
37	System watchdog	Immediate switch-off		Error during execution of system software	Contact SEW Service.
38	System software	Immediate switch-off		System error	Contact SEW Service.
39	Reference travel	Immediate switch-off		• Reference cam missing or does not switch • Limit switches not connected correctly • Reference travel type changed during reference travel	• Check reference cam • Check connection of limit switches • Check reference travel type setting and the parameters required for it
40	Boot synchronization	Immediate switch-off		**Only with DIP11B or DRS11B:** Fault during boot synchronization between inverter and option.	Install a new option card if this fault reoccurs.
41	Watchdog option	Immediate switch-off		Fault during communication between system software and option software.	Contact SEW Service.
42	Lag error	Immediate switch-off	•	• Incremental encoder connected incorrectly • Accelerating ramps too short • P-component of positioning controller too small • Speed controller parameters set incorrectly • Value of lag fault tolerance too small	• Check rotary encoder connection • Extend ramps • Set P-component to higher value • Set speed controller parameters again • Increase lag fault tolerance • Check encoder, motor and mains phase wiring • Check mechanical components can move freely, possibly blocked up
43	RS485 timeout	Rapid stop	•	Communication between inverter and PC interrupted	Check connection between inverter and PC. Contact SEW Service if necessary.
44	Unit utilization	Immediate switch-off		Unit utilization (IxT value) exceeds 125 %	• Reduce power output • Extend ramps • Use a larger inverter if the specified points are not possible.
45	Initialization	Immediate switch-off		• No parameters set for EEPROM in power section, or parameters set incorrectly. • Option card not in contact with backplane bus.	• Restore factory settings. Consult SEW Service if the fault still cannot be reset. • Insert the option card correctly.
46	System bus 2 timeout	Rapid stop	•	Fault during communication via system bus 2.	Check system bus connection.
47	System bus 1 timeout	Rapid stop	•	Fault during communication via system bus 1.	Check system bus connection.
48	Hardware DRS	Immediate switch-off		**Only with DRS11B:** • Encoder signal for master faulty. • Hardware required for synchronous operation is missing.	• Check encoder wiring. • Install a new synchronous operation board.
77	IPOS$^{plus®}$ control word	No response		**Only in IPOS$^{plus®}$ operating mode:** • Attempt was made to set an invalid automatic mode (via external control). • P916 = BUSRAMP set.	• Check serial connection to external control. • Check write values of external control. • Set P916 correctly.
78	IPOS$^{plus®}$ SW limit switches	No response		**Only in IPOS$^{plus®}$ operating mode:** Programmed target position is outside travel range delimited by software limit switches.	• Check user program • Check position of software limit switches
79	HW configuration (hardware configuration)	Immediate switch-off		The following items do not match anymore after having replaced the memory card: • Power • Rated voltage • Variant identification • Range of units • Application or standard version • Option cards	Ensure identical hardware or perform factory setting (parameter = factory setting).
80	n registration	Immediate switch-off		Internal unit fault, RAM defective.	Contact SEW Service.

Fault code	Designation	Response	P	Possible cause	Action
81	Start condition	Immediate switch-off		**Only in "VFC hoist" operating mode:** Current during premagnetization phase could not be injected into motor at a high enough level: • Rated motor power too small in relation to rated inverter power. • Motor cable cross section too small.	• Check startup data and repeat startup procedure if necessary. • Check connection between inverter and motor. • Check cross section of motor cable and increase if necessary.
82	Output open	Immediate switch-off		**Only in "VFC hoist" operating mode:** • Two or all output phases interrupted. • Rated motor power too small in relation to rated inverter power.	• Check connection between inverter and motor. • Check startup data and repeat startup procedure if necessary.
84	Motor protection	Emergency stop	•	Motor utilization too high.	• Reduce load. • Extend ramps. • Observe longer pause times.
85	Copy	Immediate switch-off		Fault when copying parameters.	Check connection between inverter and PC.
86	Memory module	Immediate switch-off		• No memory card • Encoder defective	• Tighten knurled screw • Insert and secure memory card • Replace memory card
87	Technology function	Immediate switch-off		A technology function was activated in a standard version.	Disable technology function
88	Flying start	Immediate switch-off		**Only in VFC n-CTRL operating mode:** Actual speed > 5000 1/min when inverter enabled.	Enable only at actual speed ≤ 5000 1/min.
92	DIP operating range	Emergency stop		**Only with DIP11B option:** Drive has exceeded the permitted operating range of the absolute encoder. Setting of DIP parameter encoder type/operating range possibly incorrect.	Check position offset and zero offset parameters.
93	DIP encoder fault	Emergency stop		**Only with DIP11B option:** The encoder signals a fault, e.g. power failure. • Connection cable between encoder and DIP does not meet the requirements (twisted pair, shielded). • Cycle frequency too high for cable length. • Permitted max. speed/acceleration of encoder exceeded. • Encoder defective.	• Check absolute encoder connection. • Check connection cables. • Set correct cycle frequency. • Reduce max. traveling velocity or ramp. • Install new absolute encoder.
94	EEPROM checksum	Immediate switch-off		Inverter electronics disrupted, possibly due to effect of EMC or a defect.	Send the unit in for repair.
95	DIP plausibility error	Emergency stop		**Only with DIP11B option:** Unable to determine a plausible position. • Incorrect encoder type set. • IPOS$^{plus®}$ travel parameter set incorrectly. • Numerator/denominator factor set incorrectly. • Zero adjustment performed. • Encoder defective.	• Set the correct encoder type. • Check IPOS$^{plus®}$ travel parameters. • Check traveling velocity. • Correct numerator/denominator factor. • Reset after zero adjustment. • Install new absolute encoder.
97	Copy data	Immediate switch-off		• Memory card cannot be written or read. • Error during data transmission	• Repeat copying process • Restore default setting (P802) and repeat copying process
98	CRC error flash	Immediate switch-off		Internal unit fault Flash memory defective	Send the unit in for repair.
99	IPOS ramp calculation error	Immediate switch-off		**Only in IPOS$^{plus®}$ operating mode:** Attempt made to alter ramp times and traveling velocities when the inverter is enabled, with a sine or squared positioning ramp.	Rewrite the IPOS$^{plus®}$ program so that ramp times and traveling velocities can only be altered when the inverter is inhibited.

6.7 SEW electronics service

Send in for repair

Please contact the **SEW-EURODRIVE electronics service if a fault cannot be rectified** (→ "Customer and spare parts service").

When contacting the SEW electronics service, please always quote the digits of your service code to enable our service personnel to assist you more effectively.

Please provide the following information if you are sending the unit in for repair:

- Serial number (→ nameplate)
- Unit designation
- Standard version or application version
- Digits of the service code
- Brief description of the application (application, control via terminals or serial)
- Connected motor (motor type, motor voltage, ⅄ or Δ circuit)
- Nature of the malfunction
- Accompanying circumstances
- Your own presumptions as to what has happened
- Any unusual events preceding the problem, etc.

7 Technical Data and Dimension Sheets

7.1 CE-marking, UL approval and C-Tick

CE-marking

- Low voltage directive

  MOVIDRIVE® MDX60B/61B drive inverters comply with the regulations of the Low Voltage Directive 73/23/EEC.

- Electromagnetic compatibility (EMC)

  The designated use of MOVIDRIVE® drive inverters and regenerative power supply units is as components for installation in machinery and systems. They comply with the EMC product standard EN 61800-3 "Variable-speed electrical drives". Provided the installation instructions are complied with, they satisfy the appropriate requirements for CE-marking of the entire machine/system in which they are installed, on the basis of the EMC Directive 89/336/EEC. For detailed information on EMC compliant installation, refer to the publication "Electromagnetic Compatibility in Drive Engineering" from SEW-EURODRIVE.

- Compliance with class A or B limit was verified by a specified test setup. SEW-EURODRIVE can provide additional information to this effect on request.

CE

The CE-mark on the nameplate indicates conformity with the Low Voltage Directive 73/23/EEC and the EMC Directive 89/336/EEC. We can issue a declaration of conformity to this effect on request.

UL approval

c UL us

UL and cUL approval has been granted for the entire MOVIDRIVE® range of units. cUl is equivalent to CSA approval.

C-Tick

C-Tick approval has been granted for the entire MOVIDRIVE® range of units. C-Tick certifies conformity with the requirements of the ACA (Australian Communications Authority).

7.2 General technical data

The following table lists the technical data applicable to all MOVIDRIVE® MDX60B/61B drive inverters, regardless of their type, version, size and performance.

MOVIDRIVE® MDX60B/61B	All sizes
Interference immunity	Meets EN 61800-3
Interference emission with EMC compliant installation	According to class B limit to EN 55011 and EN 55014 Meets EN 61800-3 Sizes 0, 1, and 2 according to class A limit to EN 55011 and EN 55014 without additional measures
Ambient temperature ϑ_{amb} **Derating ambient temperature** **Climate class**	0 °C...+50 °C at I_D = 100 % I_N and f_{PWM} = 4 kHz (VFC mode) 0 °C...+40 °C at I_D = 125 % I_N and f_{PWM} = 4 kHz (VFC mode) 0 °C...+40 °C at I_D = 100 % I_N and f_{PWM} = 8 kHz (CFC mode) Derating: • 2.5 % I_N per K at 40 °C - 50 °C • 3.0 % I_N per K at 50 °C - 60 °C EN 60721-3-3, class 3K3
Storage temperature[1] ϑ_L	–25 °C...+70 °C (EN 60721-3-3, class 3K3) DBG keypad: –20 °C...+60 °C
Cooling type (DIN 51751)	Forced cooling
Enclosure **Sizes 0 to 3** **EN 60529** **Sizes 4 to 6** **(NEMA1)**	IP20 IP00 (power connections); IP10 with mounted Plexiglas cover supplied as standard
Operating mode	DB (EN 60149-1-1 and 1-3)
Overvoltage protection	III according to IEC 60664-1 (VDE 0110-1)
Pollution degree	2 according to IEC 60664-1 (VDE 0110-1)
Altitude **h**	Up to h ≤ 1000 m without restrictions. At h ≥ 1000 m (3300 ft), the following restrictions apply: • From 1000 m to max. 4000 m (3300 ft to max. 13 200 ft): – I_N reduction by 1 % per 100 m (330 ft) • From 1000 m to max. 4000 m (3300 ft to max. 13 200 ft): – I_N reduction by 3 V per 100 m (330 ft) Over 200 m (6600 ft) only overvoltage class 2, external measures are required for overvoltage class 3. Overvoltage classes to DIN VDE 0110-1.

1) For long-term storage, connect to power supply every two (2) years for at least 5 minutes, otherwise the unit's service life may be reduced.

MOVIDRIVE® MDX60B/61B series, size 0

51485AXX

Figure 57: MOVIDRIVE® MDX60/61B series, size 0

MOVIDRIVE® MDX61B series, sizes 1 to 6

52159AXX

Figure 58: MOVIDRIVE® MDX61B series, sizes 1 to 6

7.3 MOVIDRIVE® MDX60/61B...-5_3 (400/500 V units)

Size 0

MOVIDRIVE® MDX60/61B		0005-5A3-4-0_	0008-5A3-4-0_	0011-5A3-4-0_	0014-5A3-4-0_
Size		0S		0M	
INPUT					
Supply voltage	V_{mains}	3 × AC 380 V –10 % ... 3 × AC 500 V +10 %			
Supply frequency	f_{mains}	50 Hz ... 60 Hz ±5 %			
Rated mains current[1] 100 % I_{mains} (at V_{mains} = 3 × AC 400 V)	125 %	AC 1.8 A AC 2.3 A	AC 2.2 A AC 2.7 A	AC 2.8 A AC 3.5 A	AC 3.6 A AC 4.5 A
OUTPUT					
Rated output power[2] (at V_{mains} = 3 × AC 380 V AC 500 V)	P_N	1.4 kVA	1.6 kVA	2.1 kVA	2.8 kVA
Rated output current[1] (at V_{mains} = 3 × AC 400 V)	I_N	AC 2.0 A	AC 2.4 A	AC 3.1 A	AC 4.0 A
Current limitation	I_{max}	Motor and regenerative 200 % I_N, duration depending on capacity utilization			
Internal current limitation		I_{max} = 0...200 % can be set in menu (P303 / P313)			
Minimum permitted brake resistance value (4Q operation)	R_{BRmin}	68 Ω			
Output voltage	V_{out}	max. V_{mains}			
PWM frequency	f_{PWM}	Adjustable: 4/8/16 kHz (P860 / P861 / P864)			
Speed range / resolution	n_A / Δn_A	-6000 ... 0 ... +6000 min^{-1} / 0.2 min^{-1} across the entire range			
GENERAL					
Power loss at P_N	P_{Vmax}	42 W	48 W	58 W	74 W
Cooling air consumption		3 m^3/h (1.8 ft^3/min)		9 m^3/h (5.4 ft^3/min)	

1) The rated mains currents and output currents must be 20 % below the rated data at V_{mains} = 3 × AC 500 V.

2) The performance data apply to f_{PWM} = 4 kHz (factory setting in VFC operating modes).

MDX60B Standard version (VFC)	0005-5A3-4-00	0008-5A3-4-00	0011-5A3-4-00	0014-5A3-4-00
Part number	827 722 2	827 723 0	827 724 9	827 725 7
MDX60B Application version (VFC)	**0005-5A3-4-0T**	**0008-5A3-4-0T**	**0011-5A3-4-0T**	**0014-5A3-4-0T**
Part number	827 726 5	827 727 3	827 728 1	827 729 X
Constant load Recommended motor power P_{mot}	0.55 kW (0.75 HP)	0.75 kW (1.0 HP)	1.1 kW (1.5 HP)	1.5 kW (2.0 HP)
Variable torque load or constant load without overload Recommended motor power P_{mot}	0.75 kW (1.0 HP)	1.1 kW (1.5 HP)	1.5 kW (2.0 HP)	2.2 kW (3.0 HP)
Continuous output current = 125 % I_N I_D (at V_{mains} = 3 × AC 400 V and f_{PWM} = 4 kHz)	AC 2.5 A	AC 3.0 A	AC 3.8 A	AC 5.0 A
Dimensions **W × H × D**	45 × 317 × 260 mm (1.78 × 12.48 × 10.24 in)		67.5 × 317 × 260 mm (2.66 × 12.48 × 10.24 in)	
Weight	2.0 kg (4.4 lb)		2.5 kg (5.5 lb)	

MDX61B Standard version (VFC/CFC/SERVO)	0005-5A3-4-00	0008-5A3-4-00	0011-5A3-4-00	0014-5A3-4-00
Part number	827 730 3	827 731 1	827 732 X	827 733 8
MDX61B Application version (VFC/CFC/SERVO)	**0005-5A3-4-0T**	**0008-5A3-4-0T**	**0011-5A3-4-0T**	**0014-5A3-4-0T**
Part number	827 734 6	827 735 4	827 736 2	827 737 0
VFC operating mode	Recommended motor power → MDX60B			
CFC operating mode Continuous output current = 100% I_N I_D	AC 2.0 A	AC 2.4 A	AC 3.1 A	AC 4.0 A
Dimensions **W × H × D**	72.5 × 317 × 260 mm (1.78 × 12.48 × 10.24 in)		95 × 317 × 260 mm (3.74 × 12.48 × 10.24 in)	
Weight	2.3 kg (5.1 lb)		2.8 kg (6.2 lb)	

Size 1 (400/500 V units)

MOVIDRIVE® MDX61B		0015-5A3-4-0_	0022-5A3-4-0_	0030-5A3-4-0_	0040-5A3-4-0_
INPUT					
Supply voltage	V_{mains}	3 × AC 380 V –10 % ... 3 × AC 500 V +10 %			
Supply frequency	f_{mains}	50 Hz ... 60 Hz ±5 %			
Rated mains current[1] 100 % I_{mains} **(at V_{mains} = 3 × AC 400 V) 125 %**		AC 3.6 A AC 4.5 A	AC 5.0 A AC 6.2 A	AC 6.3 A AC 7.9 A	AC 8.6 A AC 10.7 A
OUTPUT					
Rated output power[2] **(at V_{mains} = 3 × AC 400 V AC 500 V)**	P_N	2.8 kVA	3.8 kVA	4.9 kVA	6.6 kVA
Rated output current[1] **(at V_{mains} = 3 × AC 400 V)**	I_N	AC 4.0 A	AC 5.5 A	AC 7.0 A	AC 9.5 A
Current limitation	I_{max}	Motor and regenerative 150 % I_N, duration depending on the capacity utilization			
Internal current limitation		I_{max} = 0...150 % can be set in menu (P303 / P313)			
Minimum permitted brake resistance value (4Q operation)	R_{BRmin}	68 Ω			
Output voltage	V_{out}	max. V_{mains}			
PWM frequency	f_{PWM}	Adjustable: 4/8/16 kHz (P860 / P861 / P864)			
Speed range / resolution	n_A / Δn_A	-6000 ... 0 ... +6000 min^{-1} / 0.2 min^{-1} across the entire range			
GENERAL					
Power loss at P_N	P_{Vmax}	85 W	105 W	130 W	180 W
Cooling air consumption		40 m^3/h (24 ft^3/min)			
Weight		3.5 kg (7.72 lb)			
Dimensions	**W × H × D**	105 × 314 × 234 mm (4.13 × 12.36 × 9.21 in)			

1) The rated mains currents and output currents must be 20 % below the rated data at V_{mains} = 3 × AC 500 V.

2) The performance data apply to f_{PWM} = 4 kHz (factory setting in VFC operating modes).

MDX61B Standard version	0015-5A3-4-00	0022-5A3-4-00	0030-5A3-4-00	0040-5A3-4-00
Part number	827 957 8	827 958 6	827 959 4	827 960 8
MDX61B Application version	**0015-5A3-4-0T**	**0022-5A3-4-0T**	**0030-5A3-4-0T**	**0040-5A3-4-0T**
Part number	827 975 6	827 976 4	827 977 2	827 978 0
Constant load **Recommended motor power** **P_{mot}**	1.5 kW (2.0 HP)	2.2 kW (3.0 HP)	3.0 kW (4.0 HP)	4.0 kW (5.0 HP)
Variable torque load or constant load without overload **Recommended motor power** **P_{mot}**	2.2 kW (3.0 HP)	3.0 kW (4.0 HP)	4.0 kW (5.0 HP)	5.5 kW (7.5 HP)
VFC operating mode (f_{PWM} = 4 kHz) **Continuous output current = 125 % I_N I_D** **(at V_{mains} = 3 × AC 400 V)**	AC 5.0 A	AC 6.9 A	AC 8.8 A	AC 11.9 A
CFC/SERVO operating mode (f_{PWM} = 8 kHz) **Continuous output current = 100% I_N I_D**	AC 4.0 A	AC 5.5 A	AC 7.0 A	AC 9.5 A

Size 2S, 2 (400/500 V units)

MOVIDRIVE® MDX61B		0055-5A3-4-0_	0075-5A3-4-0_	0110-5A3-4-0_
Size		2S		2
INPUT				
Supply voltage	V_{mains}	3 × AC 380 V –10 % ... 3 × AC 500 V +10 %		
Supply frequency	f_{mains}	50 Hz ... 60 Hz ±5 %		
Rated mains current[1] 100 % I_{mains} (at V_{mains} = 3 × AC 400 V) 125 %		AC 11.3 A AC 14.1 A	AC 14.4 A AC 18.0 A	AC 21.6 A AC 27.0 A
OUTPUT				
Rated output power[2] (at V_{mains} = 3 × AC 400 V...AC 500 V)	P_N	8.7 kVA	11.2 kVA	16.8 kVA
Rated output current[1] (at V_{mains} = 3 × AC 400 V)	I_N	AC 12.5 A	AC 16 A	AC 24 A
Current limitation	I_{max}	Motor and regenerative 150 % I_N, duration depending on the capacity utilization		
Internal current limitation		I_{max} = 0...150 % can be set in menu (P303 / P313)		
Minimum permitted brake resistance value (4Q operation)	R_{BRmin}	47 Ω		22 Ω
Output voltage	V_{out}	max. V_{mains}		
PWM frequency	f_{PWM}	Adjustable: 4/8/16 kHz (P860 / P861 / P864)		
Speed range / resolution	n_A / Δn_A	-6000 ... 0 ... +6000 min^{-1} / 0.2 min^{-1} across the entire range		
GENERAL				
Power loss at P_N	P_{Vmax}	220 W	290 W	400 W
Cooling air consumption		80 m^3/h (48 ft^3/min)		
Weight		6.6 kg (14.55 lb)		
Dimensions	W × H × D	105 × 335 × 294 mm (4.13 × 13.19 × 11.57 in)		135 × 315 × 285 mm (5.12 × 12.40 × 11.22 in)

1) The rated mains currents and output currents must be 20 % below the rated data at V_{mains} = 3 × AC 500 V.

2) The performance data apply to f_{PWM} = 4 kHz (factory setting in VFC operating modes).

MDX61B Standard version	0055-5A3-4-00	0075-5A3-4-00	0110-5A3-4-00
Part number	827 961 6	827 962 4	827 963 2
MDX61B Application version	**0055-5A3-4-0T**	**0075-5A3-4-0T**	**0110-5A3-4-0T**
Part number	827 979 9	827 980 2	827 981 0
Constant load Recommended motor power P_{mot}	5.5 kW (7.5 HP)	7.5 kW (10 HP)	11 kW (15 HP)
Variable torque load or constant load without overload Recommended motor power P_{mot}	7.5 kW (10 HP)	11 kW (15 HP)	15 kW (20 HP)
VFC operating mode (f_{PWM} = 4 kHz) Continuous output current = 125 % I_N (I_D) (at V_{mains} = 3 × AC 400 V)	AC 15.6 A	AC 20.0 A	AC 30.0 A
CFC/SERVO operating mode (f_{PWM} = 8 kHz) Continuous output current = 100% I_N (I_D)	AC 12.5 A	AC 16 A	AC 24 A

Size 3 (400/500 V units)

MOVIDRIVE® MDX61B		0150-503-4-0_	0220-503-4-0_	0300-503-4-0_
INPUT				
Supply voltage	V_{mains}	3 × AC 380 V –10 % ... 3 × AC 500 V +10 %		
Supply frequency	f_{mains}	50 Hz ... 60 Hz ±5 %		
Rated mains current[1] 100 % I_{mains} **(at V_{mains} = 3 × AC 400 V) 125 %**		AC 28.8 A AC 36.0 A	AC 41.4 A AC 51.7 A	AC 54.0 A AC 67.5 A
OUTPUT				
Rated output power[2] **(at V_{mains} = 3 × AC 400 V...AC 500 V)**	P_N	22.2 kVA	31.9 kVA	41.6 kVA
Rated output current[1] **(at V_{mains} = 3 × AC 400 V)**	I_N	AC 32 A	AC 46 A	AC 60 A
Current limitation	I_{max}	Motor and regenerative 150 % I_N, duration depending on the capacity utilization		
Internal current limitation		I_{max} = 0...150 % can be set in menu (P303 / P313)		
Minimum permitted brake resistance value (4Q operation)	R_{BRmin}	15 Ω		12 Ω
Output voltage	V_{out}	max. V_{mains}		
PWM frequency	f_{PWM}	Adjustable: 4/8/16 kHz (P860 / P861 / P864)		
Speed range / resolution	n_A / Δn_A	-6000 ... 0 ... +6000 min^{-1} / 0.2 min^{-1} across the entire range		
GENERAL				
Power loss at P_N	P_{Vmax}	550 W	750 W	950 W
Cooling air consumption		180 m^3/h (108 ft^3/min)		
Weight		15.0 kg (33.07 lb)		
Dimensions	W × H × D	200 × 465 × 308 mm (7.87 × 18.31× 12.13 in)		

1) The rated mains currents and output currents must be 20 % below the rated data at V_{mains} = 3 × AC 500 V.

2) The performance data apply to f_{PWM} = 4 kHz (factory setting in VFC operating modes).

MDX61B Standard version	0150-503-4-00	0220-503-4-00	0300-503-4-00
Part number	827 964 0	827 965 9	827 966 7
MDX61B Application version	**0150-503-4-0T**	**0220-503-4-0T**	**0300-503-4-0T**
Part number	827 982 9	827 983 7	827 984 5
Constant load **Recommended motor power** **P_{mot}**	15 kW (20 HP)	22 kW (30 HP)	30 kW (40 HP)
Variable torque load or constant **load without overload** **Recommended motor power** **P_{mot}**	22 kW (30 HP)	30 kW (40 HP)	37 kW (50 HP)
VFC operating mode (f_{PWM} = 4 kHz) **Continuous output current = 125 % I_N I_D** **(at V_{mains} = 3 × AC 400 V)**	AC 40.0 A	AC 57.5 A	AC 75.0 A
CFC/SERVO operating mode (f_{PWM} = 8 kHz) **Continuous output current = 100% I_N I_D**	AC 32 A	AC 46 A	AC 60 A

Size 4 (400/500 V units)

MOVIDRIVE® MDX61B		0370-503-4-0_	0450-503-4-0_
INPUT			
Supply voltage	V_{mains}	3 × AC 380 V –10 % ... 3 × AC 500 V +10 %	
Supply frequency	f_{mains}	50 Hz ... 60 Hz ±5 %	
Rated mains current[1] 100 % I_{mains} **(at V_{mains} = 3 × AC 400 V) 125 %**		AC 65.7 A AC 81.9 A	AC 80.1 A AC 100.1 A
OUTPUT			
Rated output power[2] **(at V_{mains} = 3 × AC 400 V...AC 500 V)**	P_N	51.1 kVA	62.3 kVA
Rated output current[1] **(at V_{mains} = 3 × AC 400 V)**	I_N	AC 73 A	AC 89 A
Current limitation	I_{max}	Motor and regenerative 150 % I_N, duration depending on the capacity utilization	
Internal current limitation		I_{max} = 0...150 % can be set in menu (P303 / P313)	
Minimum permitted brake resistance value (4Q operation)	R_{BRmin}	6 Ω	
Output voltage	V_{out}	max. V_{mains}	
PWM frequency	f_{PWM}	Adjustable: 4/8/16 kHz (P860 / P861 / P864)	
Speed range / resolution	n_A / Δn_A	-6000 ... 0 ... +6000 min^{-1} / 0.2 min^{-1} across the entire range	
GENERAL			
Power loss at P_N	P_{Vmax}	1200 W	1450 W
Cooling air consumption		180 m^3/h (108 ft^3/min)	
Weight		27 kg (59.53 lb)	
Dimensions	**W × H × D**	280 × 522 × 307 mm (11.02 × 20.55 × 12.09 in)	

1) The rated mains currents and output currents must be 20 % below the rated data at V_{mains} = 3 × AC 500 V.

2) The performance data apply to f_{PWM} = 4 kHz (factory setting in VFC operating modes).

MDX61B Standard version	0370-503-4-00	0450-503-4-00
Part number	827 967 5	827 968 3
MDX61B Application version	**0370-503-4-0T**	**0450-503-4-0T**
Part number	827 985 3	827 986 1
Constant load **Recommended motor power** **P_{mot}**	37 kW (50 HP)	45 kW (60 HP)
Variable torque load or constant load without overload **Recommended motor power** **P_{mot}**	45 kW (60 HP)	55 kW (75 HP)
VFC operating mode (f_{PWM} = 4 kHz) **Continuous output current = 125 % I_N I_D** **(at V_{mains} = 3 × AC 400 V)**	AC 91 A	AC 111 A
CFC/SERVO operating mode (f_{PWM} = 8 kHz) **Continuous output current = 100% I_N I_D**	AC 73 A	AC 89 A

Size 5 (400/500 V units)

MOVIDRIVE® MDX61B		0550-503-4-0_	0750-503-4-0_
INPUT			
Supply voltage	V_{mains}	3 × AC 380 V –10 % ... 3 × AC 500 V +10 %	
Supply frequency	f_{mains}	50 Hz ... 60 Hz ±5 %	
Rated mains current[1] 100 % I_{mains} **(at V_{mains} = 3 × AC 400 V) 125 %**		AC 94.5 A AC 118.1 A	AC 117.0 A AC 146.3 A
OUTPUT			
Rated output power[2] **(at V_{mains} = 3 × AC 400 V...500 V)**	P_N	73.5 kVA	91.0 kVA
Rated output current[1] **(at V_{mains} = 3 × AC 400 V)**	I_N	AC 105 A	AC 130 A
Current limitation	I_{max}	Motor and regenerative 150 % I_N, duration depending on the capacity utilization	
Internal current limitation		I_{max} = 0...150 % can be set in menu (P303 / P313)	
Minimum permitted brake resistance value (4Q operation)	R_{BRmin}	6 Ω	4 Ω
Output voltage	V_{out}	max. V_{mains}	
PWM frequency	f_{PWM}	Adjustable: 4/8/16 kHz (P860 / P861 / P864)	
Speed range / resolution	n_A / Δn_A	-6000 ... 0 ... +6000 min^{-1} / 0.2 min^{-1} across the entire range	
GENERAL			
Power loss at P_N	P_{Vmax}	1700 W	2000 W
Cooling air consumption		360 m^3/h (216 ft^3/min)	
Weight		35 kg (77.18 lb)	
Dimensions	**W × H × D**	280 × 610 × 330 mm (11.02 × 24.02 × 12.99 in)	

1) The rated mains currents and output currents must be 20 % below the rated data at V_{mains} = 3 × AC 500 V.

2) The performance data apply to f_{PWM} = 4 kHz (factory setting in VFC operating modes).

MDX61B Standard version	0550-503-4-00	0750-503-4-00
Part number	827 969 1	827 970 5
MDX61B Application version	**0550-503-4-0T**	**0750-503-4-0T**
Part number	827 988 8	827 989 6
Constant load **Recommended motor power** **P_{mot}**	55 kW (75 HP)	75 kW (100 HP)
Variable torque load or constant load without overload **Recommended motor power** **P_{mot}**	75 kW (100 HP)	90 kW (120 HP)
VFC operating mode (f_{PWM} = 4 kHz) **Continuous output current = 125 % I_N I_D** **(at V_{mains} = 3 × AC 400 V)**	AC 131 A	AC 162 A
CFC/SERVO operating mode (f_{PWM} = 8 kHz) **Continuous output current = 100% I_N I_D**	AC 105 A	AC 130 A

Size 6 (400/500 V units)

MOVIDRIVE® MDX61B		0900-503-4-0_	1100-503-4-0_	1320-503-4-0_
INPUT				
Supply voltage	V_{mains}	3 × AC 380 V –10 % ... 3 × AC 500 V +10 %		
Supply frequency	f_{mains}	50 Hz ... 60 Hz ±5 %		
Rated mains current[1] 100 % I_{mains} (at V_{mains} = 3 × AC 400 V) 125 %		AC 153 A AC 191 A	AC 180 A AC 225 A	AC 225 A AC 281 A
OUTPUT				
Rated output power[2] (at V_{mains} = 3 × AC 380 V...500 V)	P_N	118 kVA	139 kVA	174 kVA
Rated output current[1] (at V_{mains} = 3 × AC 400 V)	I_N	AC 170 A	AC 200 A	AC 250 A
Current limitation	I_{max}	Motor and regenerative 150 % I_N, duration depending on the capacity utilization		
Internal current limitation		I_{max} = 0...150 % can be set in menu (P303 / P313)		
Minimum permitted brake resistance value (4Q operation)	R_{BRmin}	2.7 Ω		
Output voltage	V_{out}	max. V_{mains}		
PWM frequency	f_{PWM}	Adjustable with VFC: 4 or 8 kHz (P860 / P861); with CFC/SERVO fixed at 8 kHz		
Speed range / resolution	n_A / Δn_A	–6000 ... 0 ... +6000 min^{-1} / 0.2 min^{-1} across the entire range		
GENERAL				
Power loss at P_N	P_{Vmax}	2300 W	2500 W	2700 W
Cooling air consumption		600 m^3/h (360 ft^3/min)		
Weight		60 kg (132 lb)		
Dimensions	W × H × D	280 × 1000 × 382mm (11.02 × 39.37 × 15.04 in)		

1) The rated mains currents and output currents must be 20 % below the rated data at V_{mains} = 3 × AC 500 V.

2) MDF and MDV units in VFC operating modes: The performance data apply to f_{PWM} = 4 kHz (factory setting).

MDX61B Standard version	0900-503-4-00	1100-503-4-00	1320-503-4-00
Part number	827 971 3	827 972 1	827 974 8
MDX61B Application version	**0900-503-4-0T**	**1100-503-4-0T**	**1320-503-4-0T**
Part number	827 991 8	827 992 6	827 993 4
Constant load Recommended motor power P_{mot}	90 kW (120 HP)	110 kW (147 HP)	132 kW (177 HP)
Variable torque load or constant load without overload Recommended motor power P_{mot}	110 kW (147 HP)	132 kW (177 HP)	160 kW (215 HP)
VFC operating mode (f_{PWM} = 4 kHz) Continuous output current = 125 % I_N I_D (at V_{mains} = 3 × AC 400 V)	AC 212 A	AC 250 A	AC 312 A
CFC operating mode Continuous output current = 100% I_N I_D	AC 170 A	AC 200 A	AC 250 A

7.4 MOVIDRIVE® MDX61B...-2_3 (230 V units)

Size 1 (230 V units)

MOVIDRIVE® MDX61B		0015-2A3-4-0_	0022-2A3-4-0_	0037-2A3-4-0_
INPUT				
Supply voltage	V_{mains}	3 × AC 200 V –10 % ... 3 × AC 240 V +10 %		
Supply frequency	f_{mains}	50 Hz ... 60 Hz ±5 %		
Rated mains current 100 % (at V_{mains} = 3 × AC 230 V) **125 %**	I_{mains}	AC 6.7 A AC 8.4 A	AC 7.8 A AC 9.8 A	AC 12.9 A AC 16.1 A
OUTPUT				
Rated output power[1] (at V_{mains} = 3 × AC 230...240 V)	P_N	2.7 kVA	3.4 kVA	5.8 kVA
Output rated current (at V_{mains} = 3 × AC 230 V)	I_N	AC 7.3 A	AC 8.6 A	AC 14.5 A
Current limitation	I_{max}	Motor and regenerative 150 % I_N, duration depending on the capacity utilization		
Internal current limitation		I_{max} = 0...150 % can be set in menu (P303 / P313)		
Minimum permitted brake resistance value (4Q operation)	R_{BRmin}	27 Ω		
Output voltage	V_{out}	max. V_{mains}		
PWM frequency	f_{PWM}	Adjustable: 4/8/16 kHz (P860 / P861 / P864)		
Speed range / resolution	n_A / Δn_A	-6000 ... 0 ... +6000 min^{-1} / 0.2 min^{-1} across the entire range		
GENERAL				
Power loss at P_N	P_{Vmax}	110 W	126 W	210 W
Cooling air consumption		40 m^3/h (24 ft^3/min)		
Weight		2.8 kg (6.16 lb)		
Dimensions	**W × H × D**	105 × 314 × 234 mm (4.13 × 12.36 × 9.21 in)		

1) The performance data apply to f_{PWM} = 4 kHz (factory setting in VFC operating modes).

MDX61B Standard version	0015-2A3-4-00	0022-2A3-4-00	0037-2A3-4-00
Part number	827 994 2	827 995 0	827 996 9
MDX61B Application version	**0015-2A3-4-0T**	**0022-2A3-4-0T**	**0037-2A3-4-0T**
Part number	828 003 7	828 004 5	828 005 3
Constant load Recommended motor power P_{mot}	1.5 kW (2.0 HP)	2.2 kW (3.0 HP)	3.7 kW (5.0 HP)
Variable torque load or constant load without overload Recommended motor power P_{mot}	2.2 kW (3.0 HP)	3.7 kW (5.0 HP)	5.0 kW (6.8 HP)
VFC operating mode (f_{PWM} = 4 kHz) Continuous output current = 125 % I_N I_D (at V_{mains} = 3 × AC 230 V)	AC 9.1 A	AC 10.8 A	AC 18.1 A
CFC/SERVO operating mode (f_{PWM} = 8 kHz) Continuous output current = 100% I_N I_D	AC 7.3 A	AC 8.6 A	AC 14.5 A

Size 2 (230 V units)

MOVIDRIVE® MDX61B		0055-2A3-4-0_	0075-2A3-4-0_
INPUT			
Supply voltage	V_{mains}	3 × AC 200 V –10 % ... 3 × AC 240 V +10 %	
Supply frequency	f_{mains}	50 Hz ... 60 Hz ±5 %	
Rated mains current 100 % (at V_{mains} = 3 × AC 230 V) **125 %**	I_{mains}	AC 19.5 A AC 24.4 A	AC 27.4 A AC 34.3 A
OUTPUT			
Rated output power[1] (at V_{mains} = 3 × AC 230...240 V)	P_N	8.8 kVA	11.6 kVA
Output rated current (at V_{mains} = 3 × AC 230 V)	I_N	AC 22 A	AC 29 A
Current limitation	I_{max}	Motor and regenerative 150 % I_N, duration depending on the capacity utilization	
Internal current limitation		I_{max} = 0...150 % can be set in menu (P303 / P313)	
Minimum permitted brake resistance value (4Q operation)	R_{BRmin}	12 Ω	
Output voltage	V_{out}	max. V_{mains}	
PWM frequency	f_{PWM}	Adjustable: 4/8/16 kHz (P860 / P861 / P864)	
Speed range / resolution	n_A / Δn_A	-6000 ... 0 ... +6000 min^{-1} / 0.2 min^{-1} across the entire range	
GENERAL			
Power loss at P_N	P_{Vmax}	300 W	380 W
Cooling air consumption		80 m^3/h (48 ft^3/min)	
Weight		5.9 kg (12.98 lb)	
Dimensions	W × H × D	135 × 315 × 285 mm (5.12 × 12.40 × 11.22 in)	

1) The performance data apply to f_{PWM} = 4 kHz (factory setting in VFC operating modes).

MDX61B Standard version	0055-2A3-4-00	0075-2A3-4-00
Part number	827 997 7	827 998 5
MDX61B Application version	**0055-2A3-4-0T**	**0075-2A3-4-0T**
Part number	828 006 1	828 008 8
Constant load Recommended motor power P_{mot}	5.5 kW (7.5 HP)	7.5 kW (10 HP)
Variable torque load or constant load without overload Recommended motor power P_{mot}	7.5 kW (10 HP)	11 kW (15 HP)
VFC operating mode (f_{PWM} = 4 kHz) Continuous output current = 125 % I_N I_D (at V_{mains} = 3 × AC 230 V)	AC 27.5 A	AC 36.3 A
CFC/SERVO operating mode (f_{PWM} = 8 kHz) Continuous output current = 100% I_N I_D	AC 22 A	AC 29 A

Size 3 (230 V units)

MOVIDRIVE® MDX61B		0110-203-4-0_	0150-203-4-0_
INPUT			
Supply voltage	V_{mains}	3 × AC 200 V –10 % ... 3 × AC 240 V +10 %	
Supply frequency	f_{mains}	50 Hz ... 60 Hz ±5 %	
Rated mains current 100 %	I_{mains}	AC 40.0 A	AC 49.0 A
(at V_{mains} = 3 × AC 230 V) 125 %		AC 50.0 A	AC 61.0 A
OUTPUT			
Rated output power[1)]	P_N	17.1 kVA	21.5 kVA
(at V_{mains} = 3 × AC 230...240 V)			
Output rated current	I_N	AC 42 A	AC 54 A
(at V_{mains} = 3 × AC 230 V)			
Current limitation	I_{max}	Motor and regenerative 150 % I_N, duration depending on the capacity utilization	
Internal current limitation		I_{max} = 0...150 % can be set in menu (P303 / P313)	
Minimum permitted brake resistance value (4Q operation)	R_{BRmin}	7.5 Ω	5.6 Ω
Output voltage	V_{out}	max. V_{mains}	
PWM frequency	f_{PWM}	Adjustable: 4/8/16 kHz (P860 / P861 / P864)	
Speed range / resolution	n_A / Δn_A	-6000 ... 0 ... +6000 min^{-1} / 0.2 min^{-1} across the entire range	
GENERAL			
Power loss at P_N	P_{Vmax}	580 W	720 W
Cooling air consumption		180 m^3/h (108 ft^3/min)	
Weight		14.3 kg (31.46 lb)	
Dimensions	**W × H × D**	200 × 465 × 308 mm (7.87 × 18.31× 12.13 in)	

1) The performance data apply to f_{PWM} = 4 kHz (factory setting in VFC operating modes).

MDX61B Standard version	0110-203-4-00	0150-203-4-00
Part number	827 999 3	828 000 2
MDX61B Application version	**0110-203-4-0T**	**0150-203-4-0T**
Part number	828 009 6	828 011 8
Constant load Recommended motor power P_{mot}	11 kW (15 HP)	15 kW (20 HP)
Variable torque load or constant load without overload Recommended motor power P_{mot}	15 kW (20 HP)	22 kW (30 HP)
VFC operating mode (f_{PWM} = 4 kHz) Continuous output current = 125 % I_N I_D (at V_{mains} = 3 × AC 230 V)	AC 52.5 A	AC 67.5 A
CFC/SERVO operating mode (f_{PWM} = 8 kHz) Continuous output current = 100% I_N I_D	AC 42 A	AC 54 A

Size 4 (230 V units)

MOVIDRIVE® MDX61B		0220-203-4-0_	0300-203-4-0_
INPUT			
Supply voltage	V_{mains}	3 × AC 200 V –10 % ... 3 × AC 240 V +10 %	
Supply frequency	f_{mains}	50 Hz ... 60 Hz ±5 %	
Rated mains current 100 %	I_{mains}	AC 72 A	AC 86 A
(at V_{mains} = 3 × AC 230 V) 125 %		AC 90 A	AC 107 A
OUTPUT			
Rated output power[1)]	P_N	31.8 kVA	37.8 kVA
(at V_{mains} = 3 × AC 230...240 V)			
Output rated current	I_N	AC 80 A	AC 95 A
(at V_{mains} = 3 × AC 230 V)			
Current limitation	I_{max}	Motor and regenerative 150 % I_N, duration depending on the capacity utilization	
Internal current limitation		I_{max} = 0...150 % can be set in menu (P303 / P313)	
Minimum permitted brake resistance value (4Q operation)	R_{BRmin}	3.0 Ω	
Output voltage	V_{out}	max. V_{mains}	
PWM frequency	f_{PWM}	Adjustable: 4/8/16 kHz (P860 / P861 / P864)	
Speed range / resolution	n_A / Δn_A	-6000 ... 0 ... +6000 min^{-1} / 0.2 min^{-1} across the entire range	
GENERAL			
Power loss at P_N	P_{Vmax}	1100 W	1300 W
Cooling air consumption		180 m^3/h (108 ft^3/min)	
Weight		26.3 kg (57.86 lb)	
Dimensions	**W × H × D**	280 × 522 × 307 mm (11.02 × 20.55 × 12.09 in)	

1) The performance data apply to f_{PWM} = 4 kHz (factory setting in VFC operating modes).

MDX61B Standard version	0220-203-4-00	0300-203-4-00
Part number	828 001 0	828 002 9
MDX61B Application version	**0220-203-4-0T**	**0300-203-4-0T**
Part number	828 012 6	828 013 4
Constant load Recommended motor power P_{mot}	22 kW (30 HP)	30 kW (40 HP)
Variable torque load or constant load without overload Recommended motor power P_{mot}	30 kW (40 HP)	37 kW (50 HP)
VFC operating mode (f_{PWM} = 4 kHz) Continuous output current = 125 % I_N I_D (at V_{mains} = 3 × AC 230 V)	AC 100 A	AC 118 A
CFC/SERVO operating mode (f_{PWM} = 8 kHz) Continuous output current = 100% I_N I_D	AC 80 A	AC 95 A

7.5 MOVIDRIVE® MDX60/61B electronics data

MOVIDRIVE® MDX60/61B		General electronics data	
Voltage supply for setpoint input	X11:1 X11:5	REF1: +DC 10 V +5 % / –0 %, I_{max} = 3 mA REF2: -DC 10 V +0 % / –5 %, I_{max} = 3 mA	Reference voltages for setpoint potentiometer
Setpoint input n1	X11:2/X11:3	AI11/AI12: Voltage or current input, can be set with S11 and P11_, sampling interval 1 ms	
(Differential input) Operating mode AI11/AI12 Resolution Internal resistance		Voltage input: n1 = 0...+10 V or –10 V...0...+10 V 12 bits R_i = 40 kΩ (external voltage supply) R_i = 20 kΩ (supply from REF1/REF2)	Current input: n1 = 0...20 mA or 4...20 mA 11 bits R_i = 250 Ω
Internal setpoints		Parameter set 1: n11/n12/n13 = -6000...0...+6000 min^{-1} Parameter set 2: n21/n22/n23 = -6000...0...+6000 min^{-1}	
Time ranges of speed ramps at Δn = 3000 min^{-1}		1. Ramp t11/t21 Up: 0.0...2000 s Down: 0.0...2000 s 2. Ramp t12/t22 Up = down: 0.0...2000 s Stop ramp t13/t23 Down: 0...20 s Emergency ramp t14/t24 Down: 0...20 s Motor potentiometer t3 Up: 0.2...50 s Down: 0.2...50 s	
Auxiliary voltage output[1)] X13:8/X10:8		VO24: V_{OUT} = DC 24 V, maximum current carrying capacity I_{max} = 200 mA per output	
External voltage supply[1)] X10:9		VI24: V_{IN} = DC 24 V –15 % / +20 % (range: DC 19.2...30 V) to EN 61131-2	
Binary inputs X13:1...X13:6 and X16:1/X16:2 Internal resistance		Isolated (optocoupler), PLC compatible (EN 61131), sampling interval 1 ms DIØØ...DIØ5 and DIØ6/DIØ7 R_i ≈ 3.0 kΩ, I_E ≈ 10 mA	
Signal level		+13 V...+30 V = "1" = contact closed –3 V...+5 V = "0" = contact open	To EN 61131
Function X13:1 X13:2...X13:6, X16:1/X16:2		DIØØ: fixed assigned with "/Controller inhibit" DIØ1...DIØ5, DIØ6/DIØ7: Selection option → Parameter menu P60_	
Binary outputs[1)] X10:3/X10:7 and X16:3...X16:5		PLC compatible (EN 61131-2), response time 1 ms DBØØ/DOØ2 and DOØ3...DOØ5	
Signal level		"0" = 0 V "1" = +24 V **Important:** Do not apply external voltage!	
Function X10:3 X10:7, X16:3...X16:5		DBØØ: With fixed assignment "/Brake", I_{max} = 150 mA, short-circuit proof DOØ2, DOØ3...DOØ5: Selection option → Parameter menu P62_, I_{max} = 50 mA, short-circuit proof	
Relay output X10:4...X10:6		DOØ1: Load capacity of the relay contacts V_{max} = DC 30 V, I_{max} = 800 mA	
Function X10:4 X10:5 X10:6		DOØ1-C: Shared relay contact DOØ2-NO: NO contact DOØ2-NC: NC contact	Selection option → Parameter menu P62_
System bus (SBus) X12:1 X12:2 X12:3		DGND: Reference potential SC11: SBus high SC12: SBus low	CAN bus to CAN specification 2.0, parts A and B, transmission technology to ISO 11898, max. 64 stations, terminating resistor (120 Ω) can be activated using DIP switches
RS-485 interface X13:10 X13:11		ST11: RS-485 + ST12: RS-485-	EIA standard, 9.6 kBaud, max. 32 stations, max. cable length 200 m (660 ft) in total Dynamic terminating resistor with fixed installation
TF/TH input X10:1		TF1: Response threshold at R_{TF} ≥ 2.9 kΩ ±10 %	
Safety contact X17:1 X17:2 X17:3 X17:4 Permitted line cross section Internal resistance		DGND: Reference potential for binary signals VO24: : V_{OUT} = DC 24 V, maximum current carrying capacity I_{max} = 200 mA SOV24: Reference potential for +24 V input "Safe stop" (safety contact) SVI24: +24 V input "Safe stop" (safety contact) One core per terminal: 0.08...1.5 mm^2 (AWG28...16) R_i ≈ 3.0 kΩ, I_E ≈ 10 mA	
Signal level		+13 V...+30 V = "1" = contact closed –3 V...+5 V = "0" = contact open	To EN 61131
Reference terminals X11:4 X12:1/X13:9/X16:6/X10:2/X10:10 X13:7		AGND: Reference potential for analog signals and terminals X11:1 and X11:5 (REF1/REF2) DGND: Reference potential for binary signals, system bus, RS-485 interface and TF/TH DCOM: Reference potential for binary inputs X13:1...X13:6 and X16:1/X16:2 (DIØØ...DIØ5 and DIØ6/DIØ7)	
Permitted line cross section		One core per terminal: 0.20...2.5 mm^2 (AWG 24...12) Two cores per terminal: 0.25...1 mm^2 (AWG 22...17)	

1) The unit provides a current of I_{max} = 200 mA for the +24 V outputs (VO24, binary outputs, encoder supply). If this value is insufficient, a DC 24 V power supply unit must be connected to X10:9 (VI24).

7.6 MOVIDRIVE® MDX60B dimension drawings

Size 0S

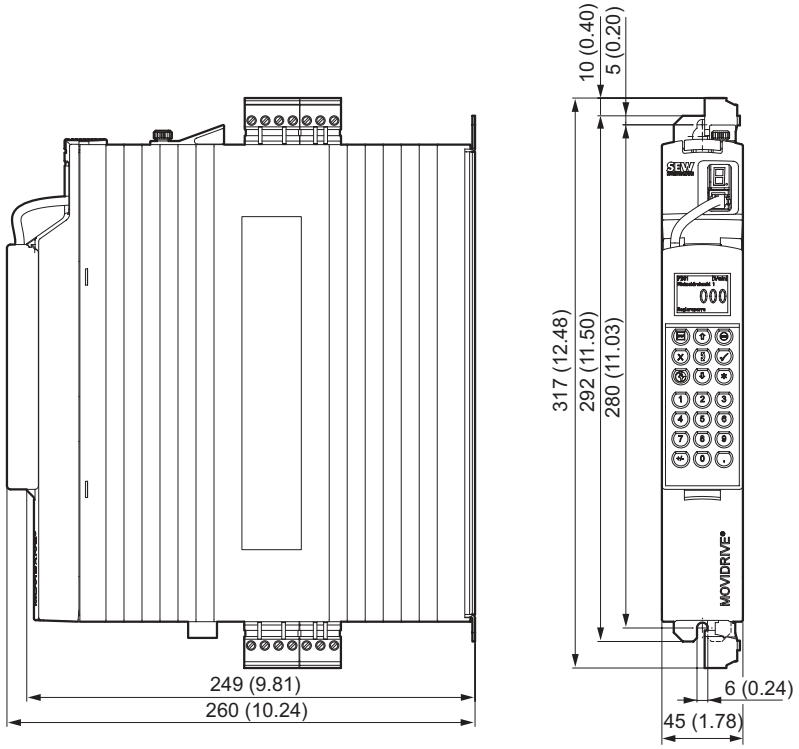

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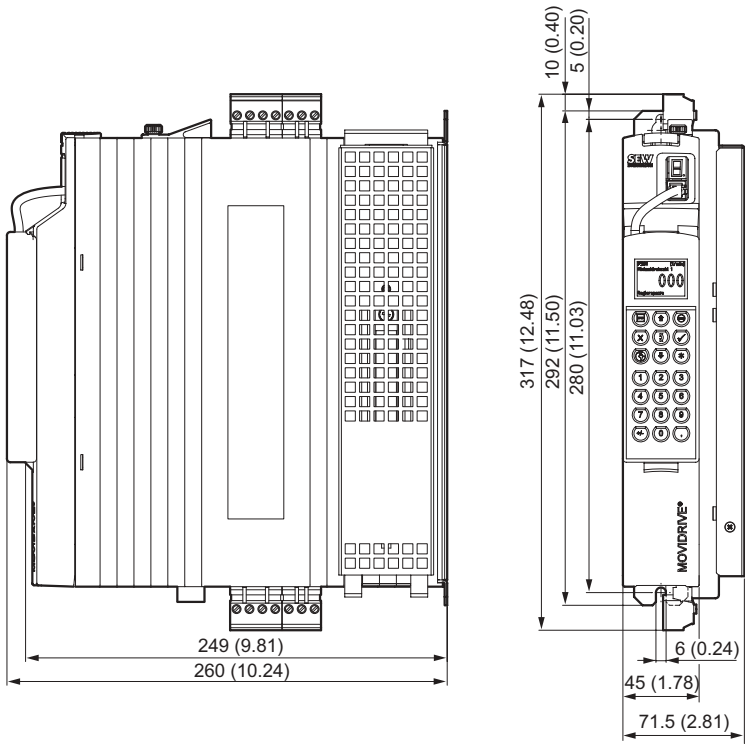
Figure 59: Dimension drawing MDX60B, size 0S, dimensions in mm (in)

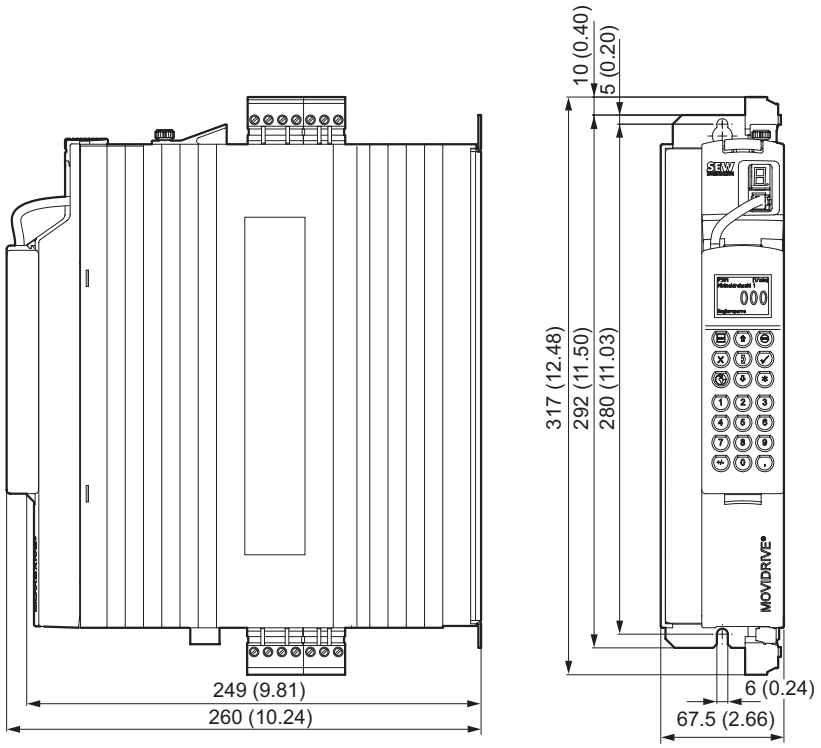
Size 0S with mounted braking resistor



53020AXX

Figure 60: Dimension drawing MDX60B, size 0S with braking resistor, dimensions in mm (in)

Size 0M



53022AXX

Figure 61: Dimension drawing MDX60B, size 0M, dimensions in mm (in)

Size 0M with mounted braking resistor

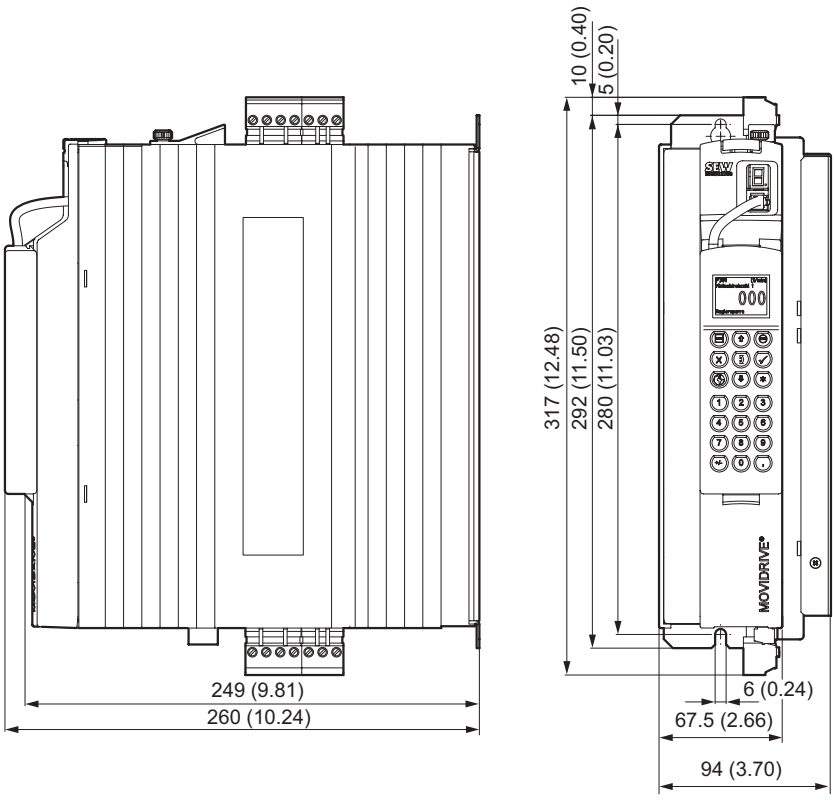


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Figure 62: Dimension drawing MDX60B, size 0M with braking resistor, dimensions in mm (in)

7.7 MOVIDRIVE® MDX61B dimension drawings

Mounting the braking resistor to MOVIDRIVE® MDX61B, sizes 0 to 6 does not influence the dimensions. The following dimension drawings are therefore shown without mounted braking resistor.

Size 0S

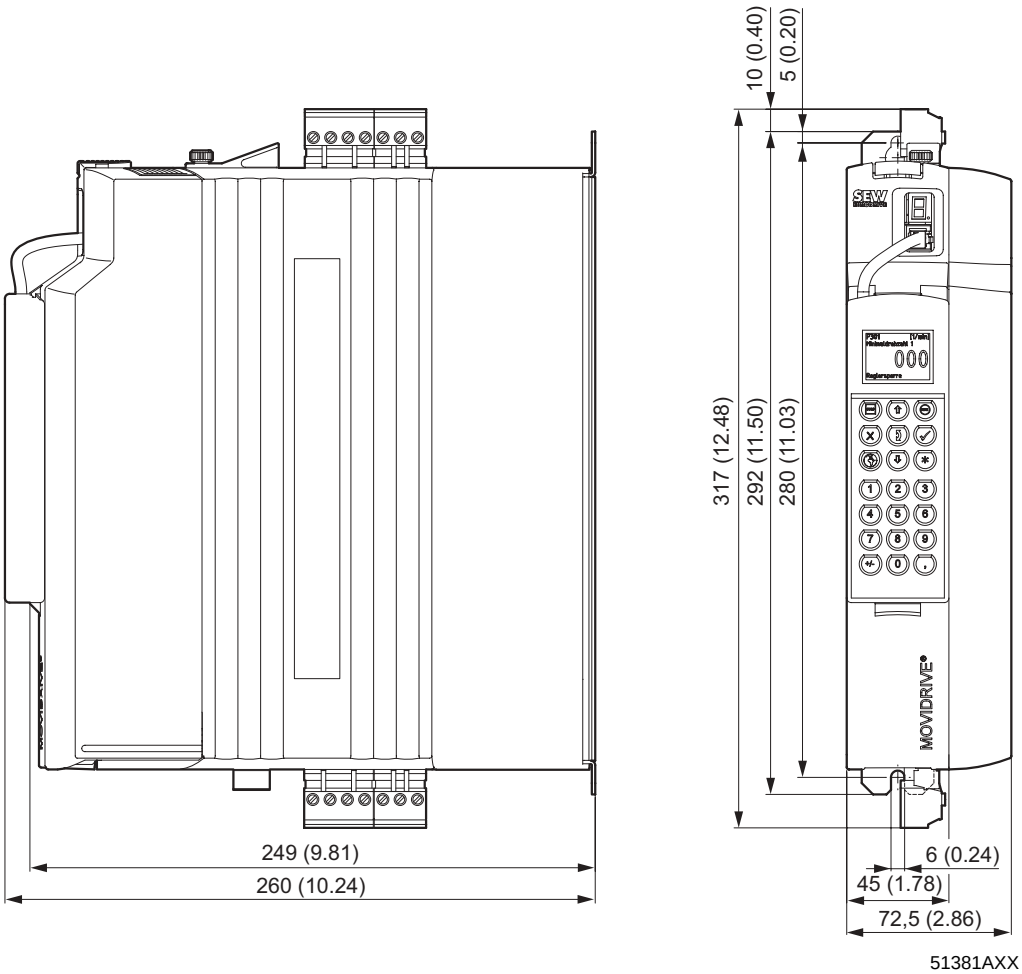

Figure 63: Dimension drawing MDX61B, size 0S, dimensions in mm (in)

Size 0M

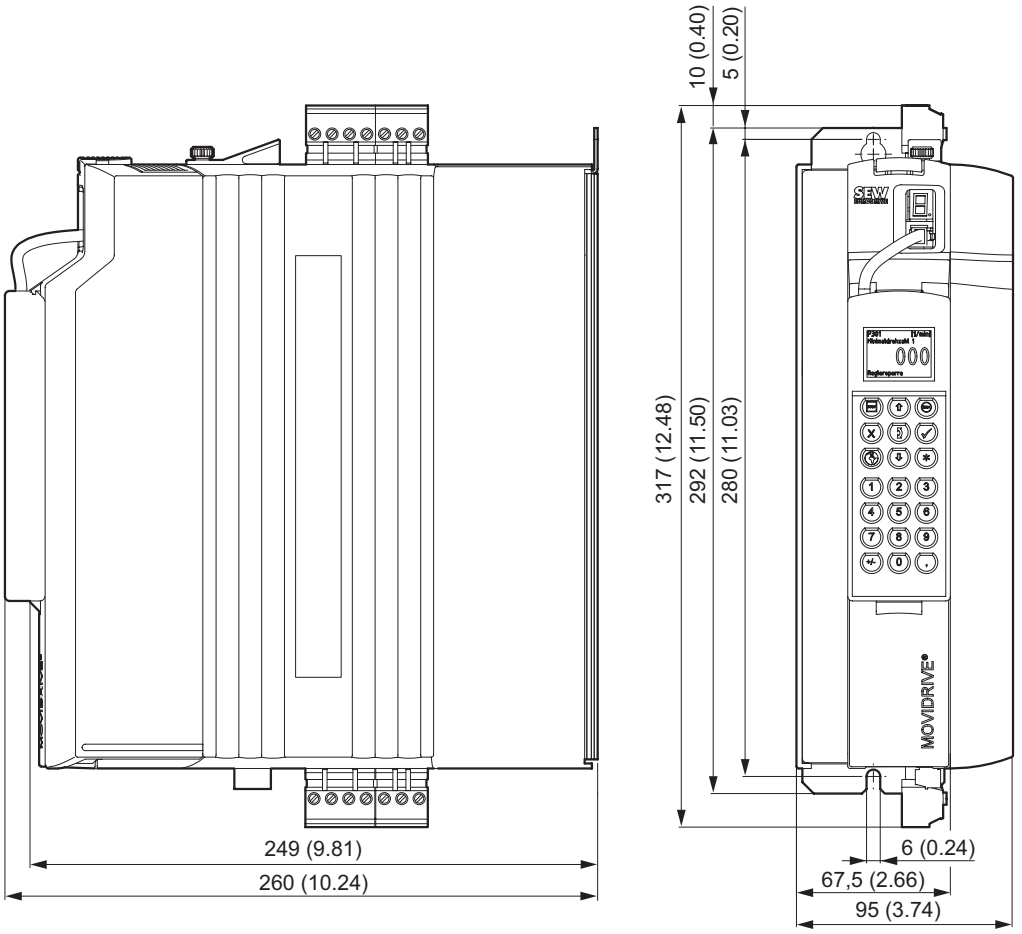

Figure 64: Dimension drawing MDX61B, size 0M, dimensions in mm (in)

Size 1

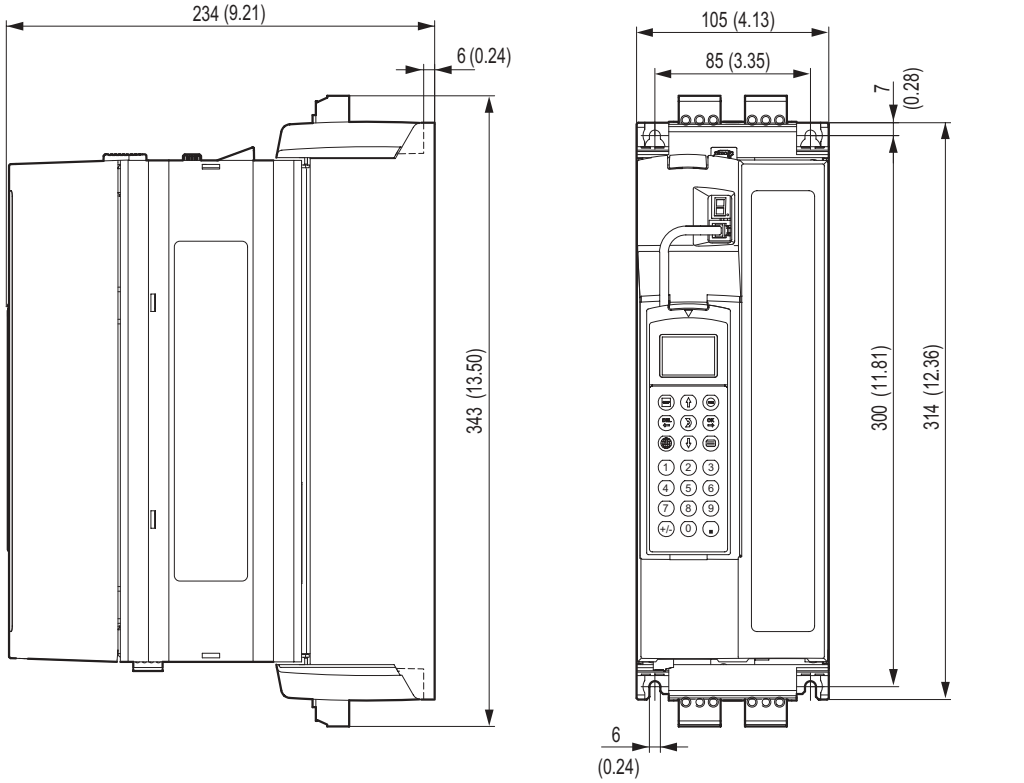

Figure 65: Dimension drawing MDX61B, size 1, dimensions in mm (in)

Size 2S

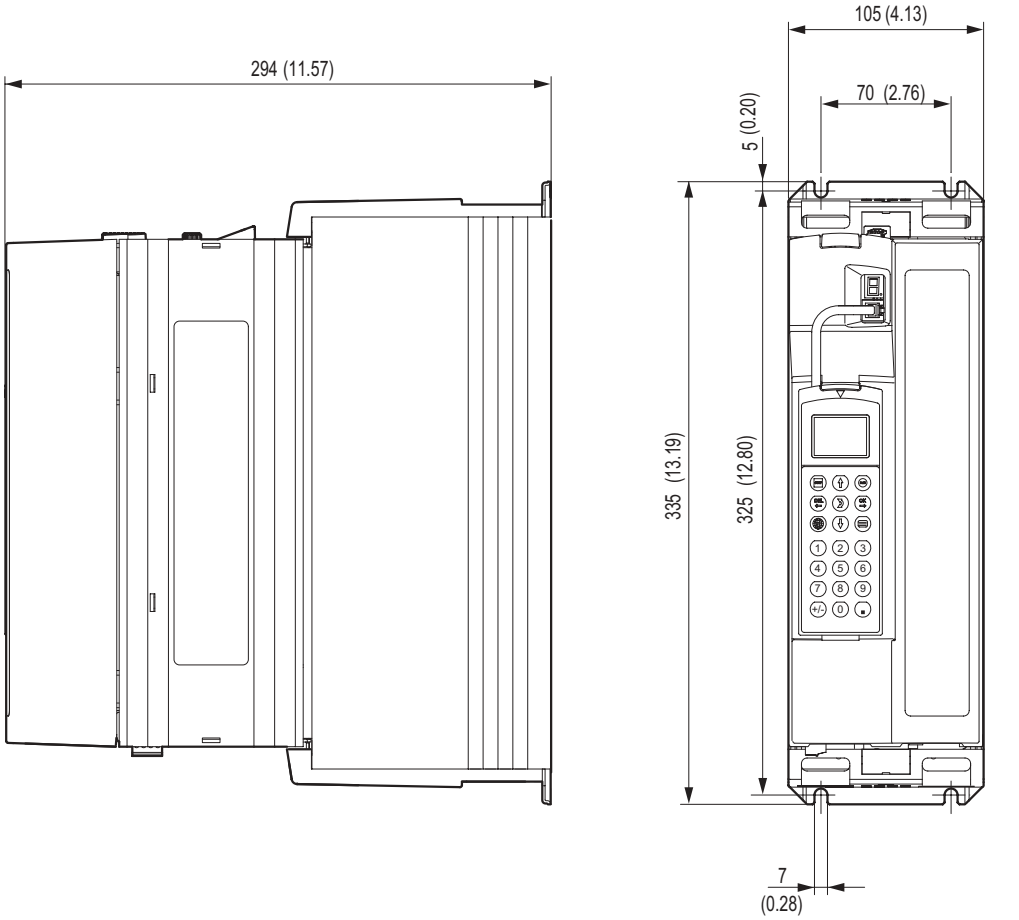

Figure 66: Dimension drawing MDX61B, size 2S, dimensions in mm (in)

Size 2

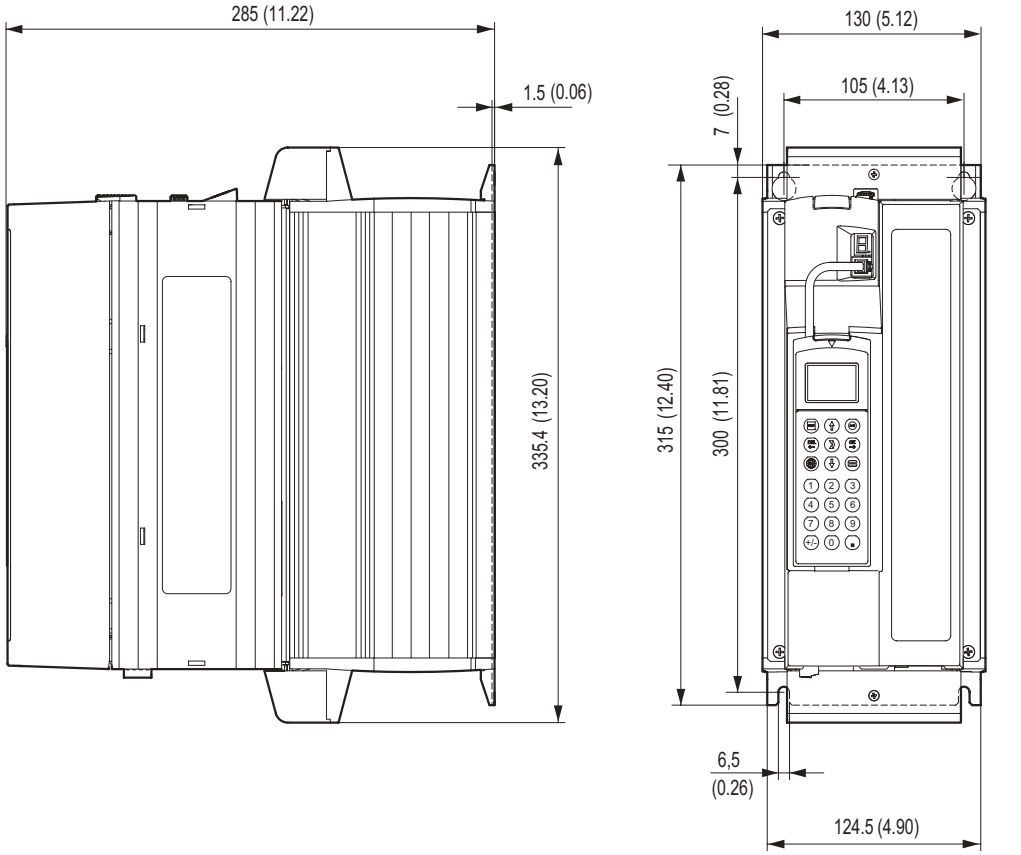

Figure 67: Dimension drawing MDX61B, size 2, dimensions in mm (in)

Size 3

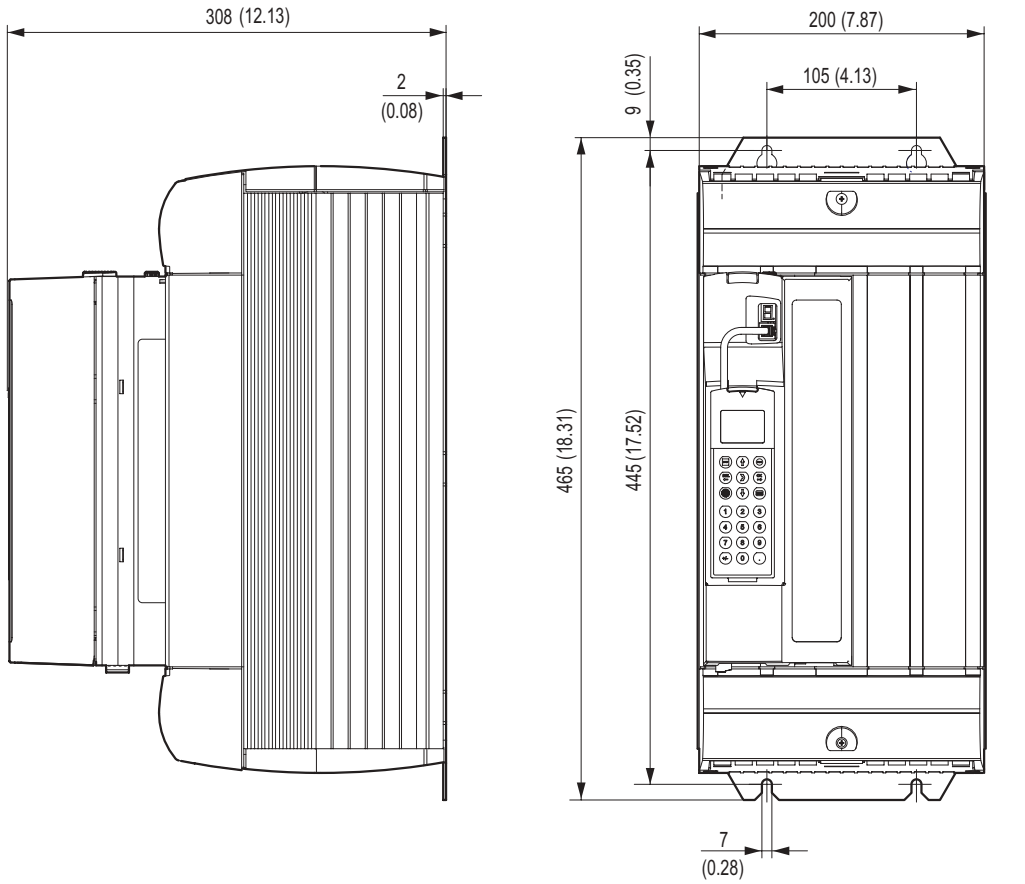

Figure 68: Dimension drawing MDX61B, size 3, dimensions in mm (in)

Size 4

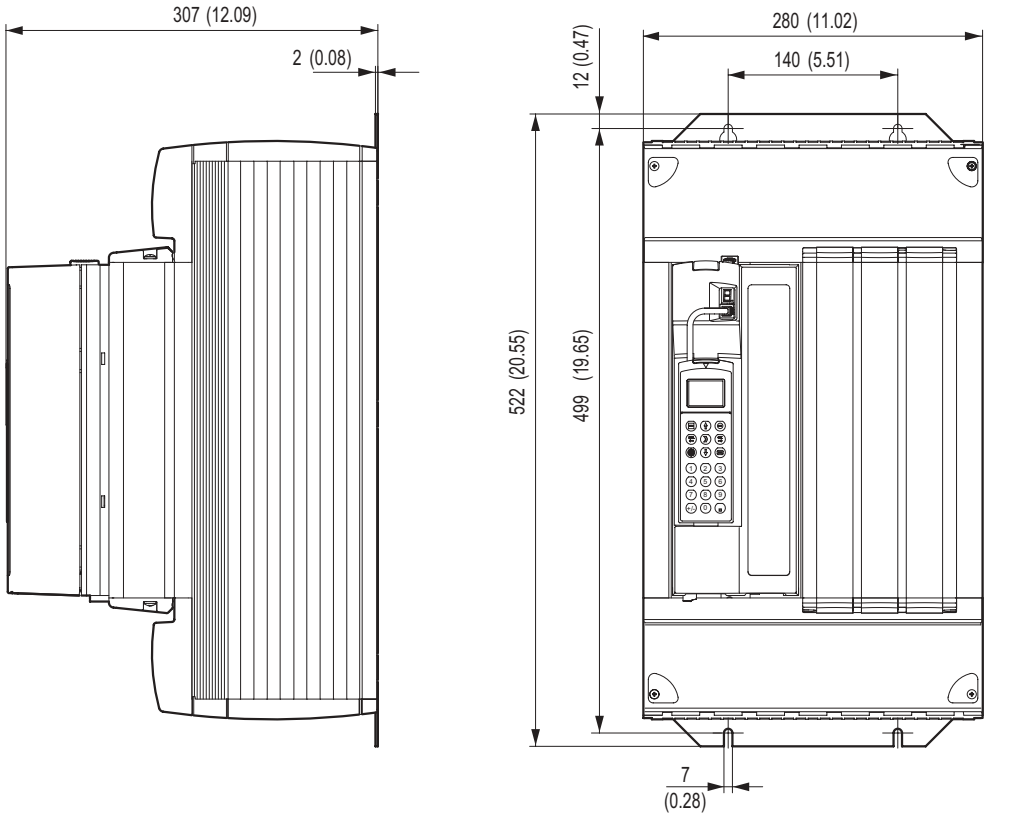

Figure 69: Dimension drawing MDX61B, size 4, dimensions in mm (in)

Size 5

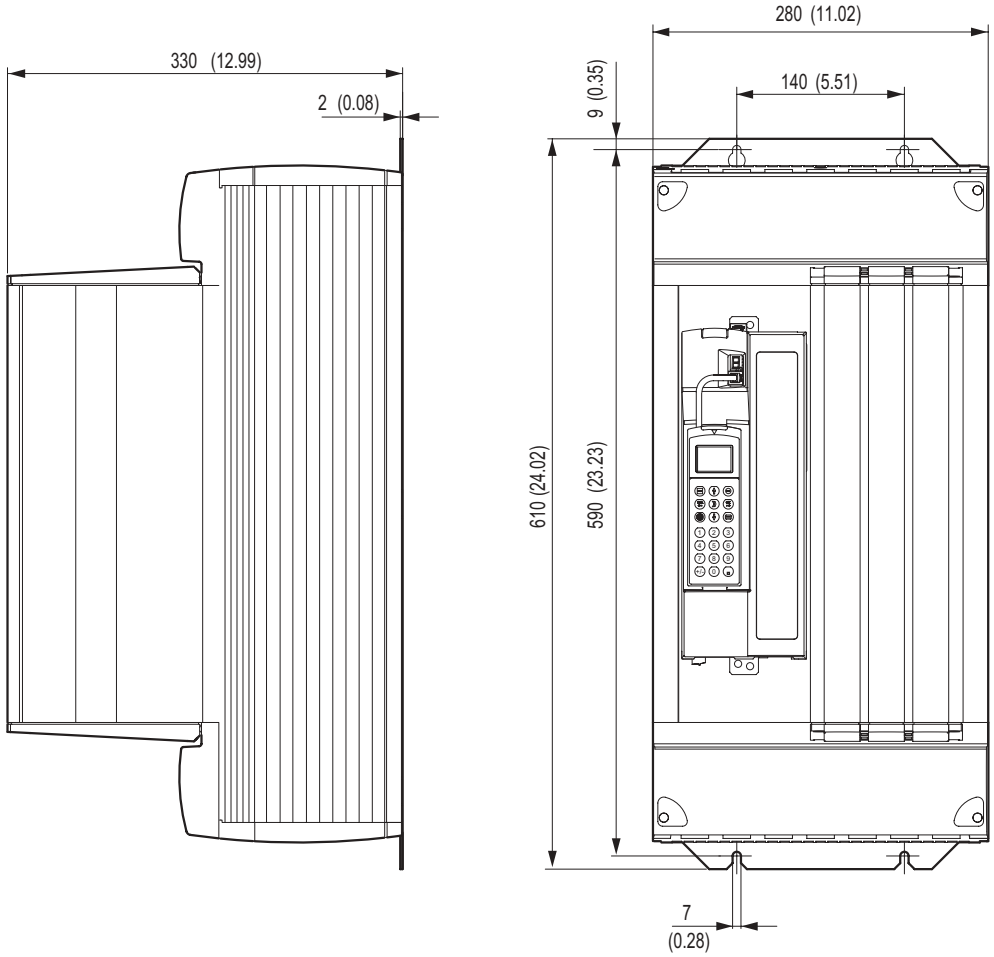

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Figure 70: Dimension drawing MDX61B, size 5, dimensions in mm (in)

Size 6

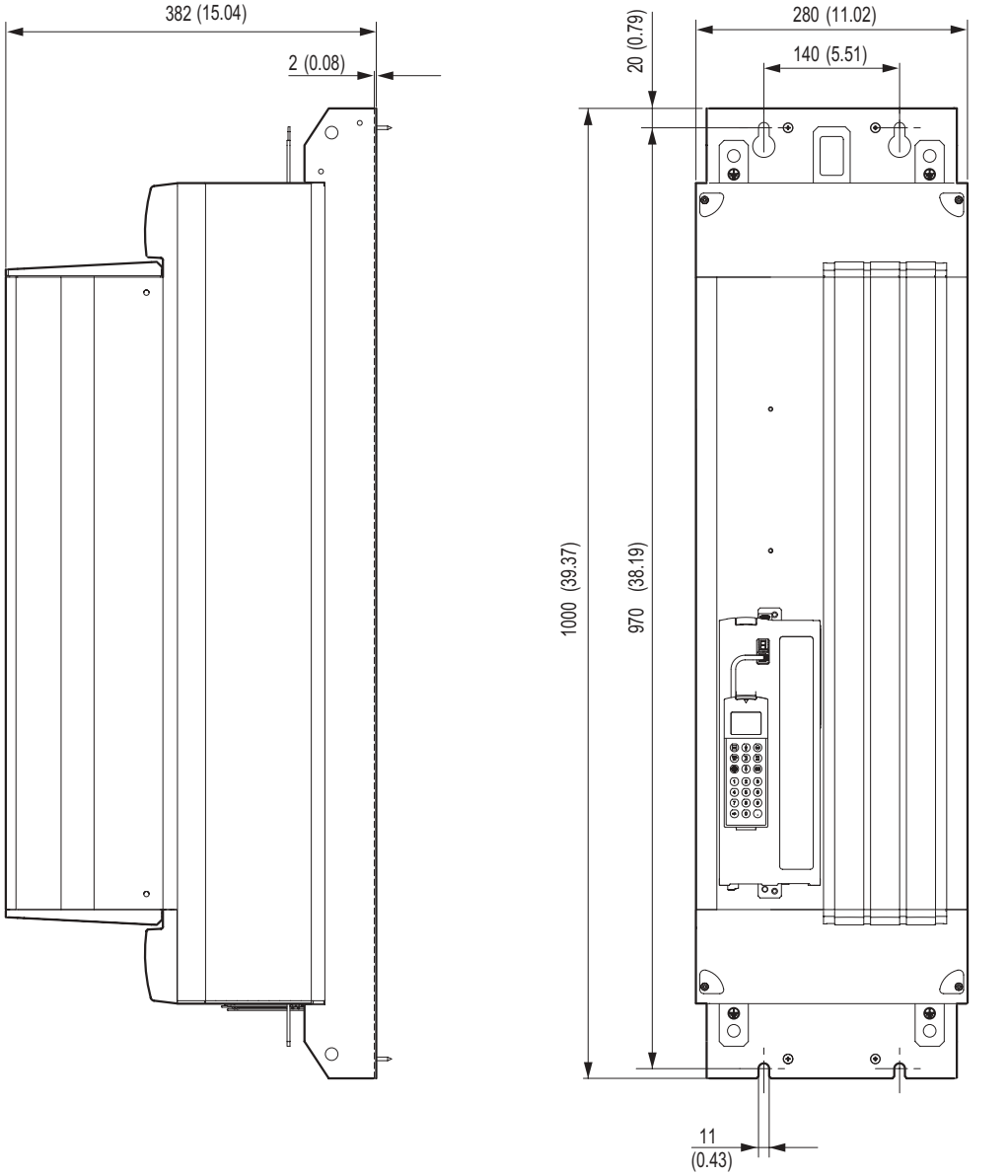

Figure 71: Dimension drawing MDX61B, size 6, dimensions in mm (in)

7.8 Technical data of DEH11B and DER11B options

Option "HIPERFACE® encoder card type DEH11B"

DEH11B option		Electronics data	
Output encoder simulation or input external encoder[1]	X14:	Output encoder simulation: Signal level to RS-422 (5 V TTL) The number of pulses is as follows: • 1024 pulses/revolution (Hiperface encoder on X15) • as on X15: Motor encoder input (sin/cos encoder or TTL sensor on X15)	Input external encoder (max. 200 kHz): Permitted encoder types: • HIPERFACE® encoder (AV1H) • sin/cos encoder 1 V_{SS} • TTL sensor Encoder power supply: +12 V, I_{max} = 180 mA
Motor encoder input[1]	X15:	Permitted encoder types: • HIPERFACE® encoder (AV1H) • sin/cos encoder 1 V_{SS} • TTL sensor Encoder power supply: +12 V, I_{max} = 180 mA	

1) The unit provides a current of I_{max} = 400 mA for the +24 V outputs (VO24, binary outputs, encoder supply). If this value is insufficient, a DC 24 V power supply unit must be connected to X10:9 (VI24).

Option " resolver card type DER11B"

DER11B option		Electronics data	
Output encoder simulation or input external encoder[1]	X14:	Output encoder simulation: Signal level to RS-422 (5 V TTL) The number of pulses is 1024 pulses/revolution	Input external encoder (max. 200 kHz): Permitted encoder types: • HIPERFACE® encoder (AV1H) • sin/cos encoder 1 V_{SS} • TTL sensor Encoder power supply: +12 V, I_{max} = 180 mA
Motor encoder input[1]	X15:	Resolver 2-pole, 3.5 $V_{AC\_r.m.s.}$, 4 kHz	

7.9 Technical data of the DIO11B option

"Terminal expansion board type DIO11B" option

DIO11B option		Electronics data	
Setpoint input n2	X20:1/X20:2	AI21/AI22: Voltage input, sampling interval 1 ms Differential input or input with AGND reference potential	
AI21/AI22 operating mode		n2 = 0...+10 V or -10 V...0...+10 V	
Resolution		12 bits	
Internal resistance		R_i = 40 kΩ	
Analog outputs	X21:1/X21:4	AOV1/AOV2: Voltage outputs -10 V...0...+10 V, I_{max} = 10 mA, short-circuit proof and protected against external voltage, selection option → Parameter menu P64_	
	X21:2/X21:5	AOC1/AOC2: Voltage outputs 0(4)...20 mA, I_{max} = 10 mA, short-circuit proof and protected against external voltage, selection option → Parameter menu P64_	
Binary inputs X22:1...X22:8 Internal resistance		Isolated (optocoupler), PLC compatible (EN 61131), sampling interval 5 ms DI1Ø...DI17 $R_i \approx 3.0$ kΩ, $I_E \approx 10$ mA	
Signal level		+13 V...+30 V = "1" = contact closed -3 V...+5 V = "0" = contact open	To EN 61131
Function	X22:1...X22:8	DI1Ø...DI17: Selection option → Parameter menu P61_	
Binary outputs[1)]	X23:1...X23:8	DO1Ø...DO17: PLC compatible (EN 61131-2), response time 5 ms	
Signal level		"0" = 0 V "1" = +24 V **Important:** Do not apply external voltage!	
Function	X23:1...X23:8	DO1Ø...DO17: Selection option → Parameter menu P63_, I_{max} = 50 mA, short-circuit proof and protected against external voltage	
Reference terminals	X20:3/X21:3/X21:6	AGND: Reference potential for analog signals (AI21/AI22/AO_1/AO_2)	
	X22:9	DCOM: Reference potential for binary inputs X22:1...X22:8 (DI1Ø...DI17)	
	X22:10	DGND: Reference potential for binary signals, reference potential for 24 V power supply	
Voltage input	X23:9	24VIN: Supply voltage +24 V for binary outputs DO1Ø...DO17	
Permitted line cross section		One core per terminal: 0.08...1.5 mm^2 (AWG 28..0.16) Two cores per terminal: 0.25...1 mm^2 (AWG 22...17)	

1) The unit provides a current of I_{max} = 200 mA for the +24 V outputs (VO24, binary outputs, encoder supply). If this value is insufficient, a DC 24 V power supply unit must be connected to X23:9 (VI24).

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Address List

Germany			
Headquarters **Production** **Sales** **Service**	**Bruchsal**	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 42 D-76646 Bruchsal P.O. Box Postfach 3023 · D-76642 Bruchsal	Tel. +49 7251 75-0 Fax +49 7251 75-1970 http://www.sew-eurodrive.de sew@sew-eurodrive.de Service Electronics: Tel. +49 171 7210791 Service Gear Units and Motors: Tel. +49 172 7601377
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	Kirchheim (near München)	SEW-EURODRIVE GmbH & Co KG Domagkstraße 5 D-85551 Kirchheim	Tel. +49 89 909552-10 Fax +49 89 909552-50 scm-kirchheim@sew-eurodrive.de
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	Meerane (near Zwickau)	SEW-EURODRIVE GmbH & Co KG Dänkritzer Weg 1 D-08393 Meerane	Tel. +49 3764 7606-0 Fax +49 3764 7606-30 scm-meerane@sew-eurodrive.de
	Additional addresses for service in Germany provided on request!		

France			
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	Lyon	SEW-USOCOME Parc d'Affaires Roosevelt Rue Jacques Tati F-69120 Vaulx en Velin	Tel. +33 4 72 15 37 00 Fax +33 4 72 15 37 15
	Paris	SEW-USOCOME Zone industrielle 2, rue Denis Papin F-77390 Verneuil l'Etang	Tel. +33 1 64 42 40 80 Fax +33 1 64 42 40 88
	Additional addresses for service in France provided on request!		

Algeria			
Sales	**Alger**	Réducom 16, rue des Frères Zaghnoun Bellevue El-Harrach 16200 Alger	Tel. +213 21 8222-84 Fax +213 21 8222-84

Argentina			
Assembly **Sales** **Service**	**Buenos Aires**	SEW EURODRIVE ARGENTINA S.A. Centro Industrial Garin, Lote 35 Ruta Panamericana Km 37,5 1619 Garin	Tel. +54 3327 4572-84 Fax +54 3327 4572-21 sewar@sew-eurodrive.com.ar

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	Sydney	SEW-EURODRIVE PTY. LTD. 9, Sleigh Place, Wetherill Park New South Wales, 2164	Tel. +61 2 9725-9900 Fax +61 2 9725-9905 enquires@sew-eurodrive.com.au

Austria			
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Belgium			
Assembly **Sales** **Service**	**Brüssel**	CARON-VECTOR S.A. Avenue Eiffel 5 B-1300 Wavre	Tel. +32 10 231-311 Fax +32 10 231-336 http://www.caron-vector.be info@caron-vector.be

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Production **Sales** **Service**	**Sao Paulo**	SEW-EURODRIVE Brasil Ltda. Avenida Amâncio Gaiolli, 50 Caixa Postal: 201-07111-970 Guarulhos/SP - Cep.: 07251-250	Tel. +55 11 6489-9133 Fax +55 11 6480-3328 http://www.sew.com.br sew@sew.com.br
	Additional addresses for service in Brazil provided on request!		

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Cameroon			
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Canada			
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	Vancouver	SEW-EURODRIVE CO. OF CANADA LTD. 7188 Honeyman Street Delta. B.C. V4G 1 E2	Tel. +1 604 946-5535 Fax +1 604 946-2513 b.wake@sew-eurodrive.ca
	Montreal	SEW-EURODRIVE CO. OF CANADA LTD. 2555 Rue Leger Street LaSalle, Quebec H8N 2V9	Tel. +1 514 367-1124 Fax +1 514 367-3677 a.peluso@sew-eurodrive.ca
	Additional addresses for service in Canada provided on request!		

Chile			
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Finland			
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Ivory Coast			
Sales	**Abidjan**	SICA Ste industrielle et commerciale pour l'Afrique 165, Bld de Marseille B.P. 2323, Abidjan 08	Tel. +225 2579-44 Fax +225 2584-36
Japan			
Assembly **Sales** **Service**	**Toyoda-cho**	SEW-EURODRIVE JAPAN CO., LTD 250-1, Shimoman-no, Toyoda-cho, Iwata gun Shizuoka prefecture, 438-0818	Tel. +81 538 373811 Fax +81 538 373814 sewjapan@sew-eurodrive.co.jp
Korea			
Assembly **Sales** **Service**	**Ansan-City**	SEW-EURODRIVE KOREA CO., LTD. B 601-4, Banweol Industrial Estate Unit 1048-4, Shingil-Dong Ansan 425-120	Tel. +82 31 492-8051 Fax +82 31 492-8056 master@sew-korea.co.kr
Lebanon			
Sales	**Beirut**	Gabriel Acar & Fils sarl B. P. 80484 Bourj Hammoud, Beirut	Tel. +961 1 4947-86 +961 1 4982-72 +961 3 2745-39 Fax +961 1 4949-71 gacar@beirut.com
Lithuania			
Sales	**Alytus**	UAB Irseva Merkines g. 2A LT-4580 Alytus	Tel. +370 315 79204 Fax +370 315 79688 irmantas.irseva@one.lt
Luxembourg			
Assembly **Sales** **Service**	**Brüssel**	CARON-VECTOR S.A. Avenue Eiffel 5 B-1300 Wavre	Tel. +32 10 231-311 Fax +32 10 231-336 http://www.caron-vector.be info@caron-vector.be
Malaysia			
Assembly **Sales** **Service**	**Johore**	SEW-EURODRIVE SDN BHD No. 95, Jalan Seroja 39, Taman Johor Jaya 81000 Johor Bahru, Johor West Malaysia	Tel. +60 7 3549409 Fax +60 7 3541404 kchtan@pd.jaring.my

Morocco			
Sales	**Casablanca**	S. R. M. Société de Réalisations Mécaniques 5, rue Emir Abdelkader 05 Casablanca	Tel. +212 2 6186-69 + 6186-70 + 6186-71 Fax +212 2 6215-88 srm@marocnet.net.ma

Netherlands			
Assembly **Sales** **Service**	**Rotterdam**	VECTOR Aandrijftechniek B.V. Industrieweg 175 NL-3044 AS Rotterdam Postbus 10085 NL-3004 AB Rotterdam	Tel. +31 10 4463-700 Fax +31 10 4155-552 http://www.vector.nu info@vector.nu

New Zealand			
Assembly **Sales** **Service**	**Auckland**	SEW-EURODRIVE NEW ZEALAND LTD. P.O. Box 58-428 82 Greenmount drive East Tamaki Auckland	Tel. +64 9 2745627 Fax +64 9 2740165 sales@sew-eurodrive.co.nz
	Christchurch	SEW-EURODRIVE NEW ZEALAND LTD. 10 Settlers Crescent, Ferrymead Christchurch	Tel. +64 3 384-6251 Fax +64 3 384-6455 sales@sew-eurodrive.co.nz

Norway			
Assembly **Sales** **Service**	**Moss**	SEW-EURODRIVE A/S Solgaard skog 71 N-1599 Moss	Tel. +47 69 241-020 Fax +47 69 241-040 sew@sew-eurodrive.no

Peru			
Assembly **Sales** **Service**	**Lima**	SEW DEL PERU MOTORES REDUCTORES S.A.C. Los Calderos <FmSdata>[Idot] 120-124 Urbanizacion Industrial Vulcano, ATE, Lima	Tel. +51 1 3495280 Fax +51 1 3493002 sewperu@sew-eurodrive.com.pe

Poland			
Assembly **Sales** **Service**	**Lodz**	SEW-EURODRIVE Polska Sp.z.o.o. ul. Techniczna 5 PL-92-518 Lodz	Tel. +48 42 67710-90 Fax +48 42 67710-99 http://www.sew-eurodrive.pl sew@sew-eurodrive.pl

Portugal			
Assembly **Sales** **Service**	**Coimbra**	SEW-EURODRIVE, LDA. Apartado 15 P-3050-901 Mealhada	Tel. +351 231 20 9670 Fax +351 231 20 3685 http://www.sew-eurodrive.pt infosew@sew-eurodrive.pt

Romania			
Sales **Service**	**Bucuresti**	Sialco Trading SRL str. Madrid nr.4 71222 Bucuresti	Tel. +40 21 230-1328 Fax +40 21 230-7170 sialco@sialco.ro

Russia			
Sales	**St. Petersburg**	ZAO SEW-EURODRIVE P.O. Box 263 RUS-195220 St. Petersburg	Tel. +7 812 5357142 +812 5350430 Fax +7 812 5352287 sew@sew-eurodrive.ru

Senegal			
Sales	**Dakar**	SENEMECA Mécanique Générale Km 8, Route de Rufisque B.P. 3251, Dakar	Tel. +221 849 47-70 Fax +221 849 47-71 senemeca@sentoo.sn

Serbia and Montenegro			
Sales	**Beograd**	DIPAR d.o.o. Kajmakcalanska 54 SCG-11000 Beograd	Tel. +381 11 3046677 Fax +381 11 3809380 dipar@yubc.net

Singapore			
Assembly **Sales** **Service**	**Singapore**	SEW-EURODRIVE PTE. LTD. No 9, Tuas Drive 2 Jurong Industrial Estate Singapore 638644	Tel. +65 68621701 ... 1705 Fax +65 68612827 Telex 38 659 sales@sew-eurodrive.com.sg

Slovakia			
Sales	**Sered**	SEW-Eurodrive SK s.r.o. Trnavska 920 SK-926 01 Sered	Tel. +421 31 7891311 Fax +421 31 7891312 sew@sew-eurodrive.sk

Slovenia			
Sales **Service**	**Celje**	Pakman - Pogonska Tehnika d.o.o. UI. XIV. divizije 14 SLO – 3000 Celje	Tel. +386 3 490 83-20 Fax +386 3 490 83-21 pakman@siol.net

South Africa			
Assembly **Sales** **Service**	**Johannesburg**	SEW-EURODRIVE (PROPRIETARY) LIMITED Eurodrive House Cnr. Adcock Ingram and Aerodrome Roads Aeroton Ext. 2 Johannesburg 2013 P.O.Box 90004 Bertsham 2013	Tel. +27 11 248-7000 Fax +27 11 494-2311 ljansen@sew.co.za
	Capetown	SEW-EURODRIVE (PROPRIETARY) LIMITED Rainbow Park Cnr. Racecourse & Omuramba Road Montague Gardens Cape Town P.O.Box 36556 Chempet 7442 Cape Town	Tel. +27 21 552-9820 Fax +27 21 552-9830 Telex 576 062 dswanepoel@sew.co.za
	Durban	SEW-EURODRIVE (PROPRIETARY) LIMITED 2 Monaceo Place Pinetown Durban P.O. Box 10433, Ashwood 3605	Tel. +27 31 700-3451 Fax +27 31 700-3847 dtait@sew.co.za

Spain			
Assembly **Sales** **Service**	**Bilbao**	SEW-EURODRIVE ESPAÑA, S.L. Parque Tecnológico, Edificio, 302 E-48170 Zamudio (Vizcaya)	Tel. +34 9 4431 84-70 Fax +34 9 4431 84-71 sew.spain@sew-eurodrive.es

Sweden			
Assembly **Sales** **Service**	**Jönköping**	SEW-EURODRIVE AB Gnejsvägen 6-8 S-55303 Jönköping Box 3100 S-55003 Jönköping	Tel. +46 36 3442-00 Fax +46 36 3442-80 http://www.sew-eurodrive.se info@sew-eurodrive.se

Switzerland			
Assembly **Sales** **Service**	**Basel**	Alfred Imhof A.G. Jurastrasse 10 CH-4142 Münchenstein bei Basel	Tel. +41 61 41717-17 Fax +41 61 41717-00 http://www.imhof-sew.ch info@imhof-sew.ch

Thailand			
Assembly **Sales** **Service**	**Chon Buri**	SEW-EURODRIVE (Thailand) Ltd. Bangpakong Industrial Park 2 700/456, Moo.7, Tambol Donhuaroh Muang District Chon Buri 20000	Tel. +66 38 454281 Fax +66 38 454288 sewthailand@sew-eurodrive.co.th

Tunisia			
Sales	**Tunis**	T. M.S. Technic Marketing Service 7, rue Ibn El Heithem Z.I. SMMT 2014 Mégrine Erriadh	Tel. +216 1 4340-64 + 1 4320-29 Fax +216 1 4329-76

Turkey			
Assembly **Sales** **Service**	**Istanbul**	SEW-EURODRIVE Hareket Sistemleri Sirketi Bagdat Cad. Koruma Cikmazi No. 3 TR-81540 Maltepe ISTANBUL	Tel. +90 216 4419163 + 216 4419164 + 216 3838014 Fax +90 216 3055867 sew@sew-eurodrive.com.tr

USA			
Production **Assembly** **Sales** **Service**	**Greenville**	SEW-EURODRIVE INC. 1295 Old Spartanburg Highway P.O. Box 518 Lyman, S.C. 29365	Tel. +1 864 439-7537 Fax Sales +1 864 439-7830 Fax Manuf. +1 864 439-9948 Fax Ass. +1 864 439-0566 Telex 805 550 http://www.seweurodrive.com cslyman@seweurodrive.com
Assembly **Sales** **Service**	**San Francisco**	SEW-EURODRIVE INC. 30599 San Antonio St. Hayward, California 94544-7101	Tel. +1 510 487-3560 Fax +1 510 487-6381 cshayward@seweurodrive.com
	Philadelphia/PA	SEW-EURODRIVE INC. Pureland Ind. Complex 2107 High Hill Road, P.O. Box 481 Bridgeport, New Jersey 08014	Tel. +1 856 467-2277 Fax +1 856 467-3792 csbridgeport@seweurodrive.com
	Dayton	SEW-EURODRIVE INC. 2001 West Main Street Troy, Ohio 45373	Tel. +1 937 335-0036 Fax +1 937 440-3799 cstroy@seweurodrive.com
	Dallas	SEW-EURODRIVE INC. 3950 Platinum Way Dallas, Texas 75237	Tel. +1 214 330-4824 Fax +1 214 330-4724 csdallas@seweurodrive.com
	Additional addresses for service in the USA provided on request!		

Venezuela			
Assembly **Sales** **Service**	**Valencia**	SEW-EURODRIVE Venezuela S.A. Av. Norte Sur No. 3, Galpon 84-319 Zona Industrial Municipal Norte Valencia, Estado Carabobo	Tel. +58 241 832-9804 Fax +58 241 838-6275 sewventas@cantv.net sewfinanzas@cantv.net

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